NOTICE TO
FLOOD INSURANCE STUDY USERS

Individual components of this Flood Insurance Study (i.e., text, tables, profiles, and maps) are all subject to revision as additional data become available. Because revised components may be issued separately, study users should consult the community map repository for those components that are currently effective.

In cases where this Flood Insurance Study and any components thereof warrant revision, a Revisions Description section may be incorporated into this text. When applicable, study users should refer to the Revisions Description to obtain pertinent data and information concerning revisions.

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Lateral No. 2	Panel	10P
Hardee Creek	Panel	11P
Bells Branch	Panels	12P - 13P
Reedy Branch	Panel	14P
Meeting House Branch	Panel	15P

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Exhibit 2 - Flood Boundary and Floodway Map Index
Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

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FLOOD INSURANCE STUDY

1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this Flood Insurance Study is to investigate the existence and severity of flood hazards in the City of Greenville, Pitt County, North Carolina, and to aid in the administration of the Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. Initial use of this information will be to convert Greenville to the regular program of flood insurance by the Federal Insurance Administration. Further use of the information will be made by local and regional planners in their efforts to promote sound land use and flood plain development.

1.2 Coordination

The North Carolina Department of Natural and Economic Resources and local interests were informed of the initiation of the study and requested to furnish available pertinent information. Information was also requested from the U S. Soil Conservation Service, the National Oceanic and Atmospheric Administration, and the U.S. Geological Survey.

A meeting was held with the Federal Insurance Administration and local interests on February 11, 1975, to inform the community of the nature and purpose of the Flood Insurance Study, to solicit community input, and to identify streams requiring detailed study.

A final community coordination meeting was held with representatives of the Federal Insurance Administration, community officials, and local residents on September 28, 1976. At this meeting, the findings of the study and the potential impact of the study on the community were discussed. No opposition to the study findings was expressed.

1.3 Authority and Acknowledgments

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968, as amended.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Army Corps of Engineers, Wilmington District, for the Federal Insurance Administration, under Inter-Agency Agreement Nos. IAA-H-16-75 and IAA-H-7-76, Project Order Nos. 20 and 1, respectively. This work, which was completed in November 1976, covered all flooding sources affecting the City of Greenville.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers all of the area within the extraterritorial zoning limits of the City of Greenville, Pitt County, North Carolina, encompassing approximately 37 square miles. The area of study is shown on the Vicinity Map (Figure 1).

Greenville lies astride the Tar River and is subject to periodic flooding from the river and its tributaries, Green Mill Run and its North Fork, Fornes Run, Parkers Creek, Lateral No. 1, Lateral No. 2, Hardee Creek, Bells Branch, Reedy Branch, and Meeting House Branch. These streams within the extraterritorial zoning limits of Greenville were studied in detail.

The areas studied in detail were chosen with consideration given to all forecasted development until November 1981.

2.2 Community Description

Greenville is located in Pitt County on the eastern portion of the Coastal Plain of North Carolina, approximately 70 miles east of Raleigh and 18 miles west of Washington, North Carolina.

In 1786, the name of the original county seat of Martinsborough was changed to Greenville in honor of the Revolutionary War hero, General Nathaniel Greene, and the settlement was relocated to its present site on the Tar River. Restricted by the swampy lowland north of the river, the original 100-acre settlement grew to the west, south, and east. The coming of the railroads (the Atlantic Coast Line in 1889 and the Norfolk Southern in 1907) greatly reduced river traffic and was a major influence on the town's development. The establishment of East Carolina Teachers Training School (now East Carolina University) in 1906 has had tremendous impact on the growth of Greenville. The emergence of the university as a major source of employment has contributed significantly to the transition of the economy from agricultural to non-agricultural. Industrial manufacturing has also become important in recent years.

Greenville had a population of 22,860 in 1960 and had grown to 29,063 by 1970 (Reference 1). The city has a mild climate, with a mean annual temperature of 62°F and an annual precipitation of approximately 50 inches (Reference 2).

The topography ranges from very flat in the areas away from streams to moderately sloping and rolling in stream valleys. Elevations range from a few feet National Geodetic Vertical Datum of 1929 (NGVD)

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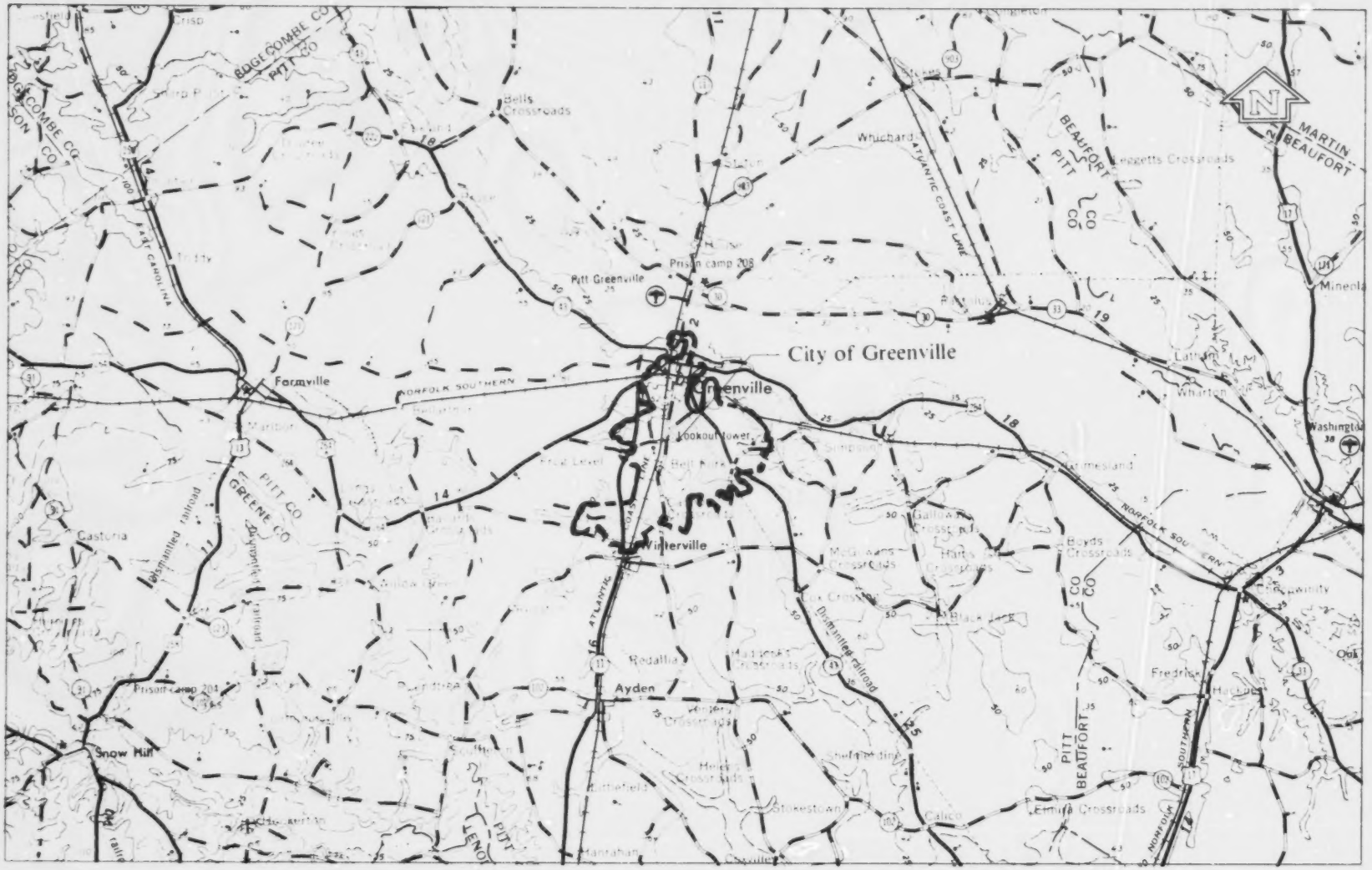

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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along the Tar River to 70 feet NGVD or more in upland areas. Soils are predominately superficial sands from 2 to 25 feet deep, underlain by dark clays and some sandstone or limestone. Fossil shells are common.

The major commercial district lies south of the Tar River, generally above expected flood elevations, while the major flood plain parallels the Tar River on the north. The most significant flood plain development in Greenville lies in this area north of the river, where industrial, commercial, and residential development has occurred in the Tar River-Parkers Creek complex. Considerable development is also located in the Green Mill Run flood plain, particularly between 10th Street and Memorial Drive. The remaining flood plains are generally undeveloped, although scattered development does exist.

2.3 Principal Flood Problems

Low-lying areas of Greenville are subject to periodic flooding from the Tar River, Green Mill Run, and their tributaries. The most severe flooding on the Tar River is usually the result of heavy rains from tropical storms, while creek flooding usually results primarily from local thunderstorms.

River stage records from the National Weather Service gage at Greenville show that a stage of 17 feet NGVD has been equalled or exceeded eight times since 1905. The highest stage of record occurred in 1919, when the Tar River crested at 22.1 feet NGVD. Flood stage at Greenville is approximately 10.6 feet NGVD. Recent minor flooding occurred on February 10, 1973, when the Tar River reached a stage of 14.2 feet NGVD.

2.4 Flood Protection Measures

A clearing and snagging project on the Tar River between Hardee Creek and Rocky Mount was completed in 1946. resulting in minor reductions in river flood stages at Greenville. Channel improvements on upper Green Mill Run, Parkers Creek, and their tributaries have been accomplished since the turn of the century, mainly as an aid to agricultural production. Local interests have completed stream channelization projects for flood control purposes for portions of Green Mill Run and Parkers Creek. Based on information contained in this study, flood plain regulations will be implemented by the city to preclude extensive flood damages to future development.

3.0 ENGINEERING METHODS

For flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Floods having recurrence intervals

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of 10, 50, 100, and 500 years have been selected as having special significance for flood plain management and for flood insurance premium rates. The analyses reported here reflect current conditions in the watersheds of the streams.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for floods of the selected recurrence intervals for each stream studied in detail.

Peak discharges were determined by the log-Pearson Type III method (Reference 3). The frequency-discharge, drainage area curve for the Tar River was developed from U.S. Geological Survey gage records since 1906 at Greenville and from a study of gages in the Tar River basin. Curves for tributary streams were developed using generalized criteria developed from records ranging from 14 to 39 years from 77 gages in the Coastal Plain gaging network in North Carolina. Peak discharges were verified by an independent determination using U.S. Weather Bureau rainfall frequency data (References 4 and 5) and synthetic unit hydrograph procedures. Peak discharge-frequency relationships for streams studied in detail are shown in Figure 2.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of streams in the community were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each stream studied in detail.

Cross section data for streams were obtained from field surveys, as were elevation data and structural geometry on bridges and culverts. Cross section locations are shown on the Flood Profiles (Exhibit 1).

Water-surface profiles for the 10-, 50-, 100-, and 500-year floods were developed using the U.S. Army Corps of Engineers HEC-2 step-backwater computer program (Reference 6).

Roughness coefficients (Manning's "n") were determined from field inspection and aerial photographs. Roughness values range from 0.035 to 0.080 in the main channels and from 0.060 to 0.200 in the overbank areas.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of ± 0.5 foot for floods of the selected recurrence intervals.

Starting elevations were determined by the slope-area method. All elevations are measured from National Geodetic Vertical Datum NGVD; elevation reference marks used in the study are shown on the maps.

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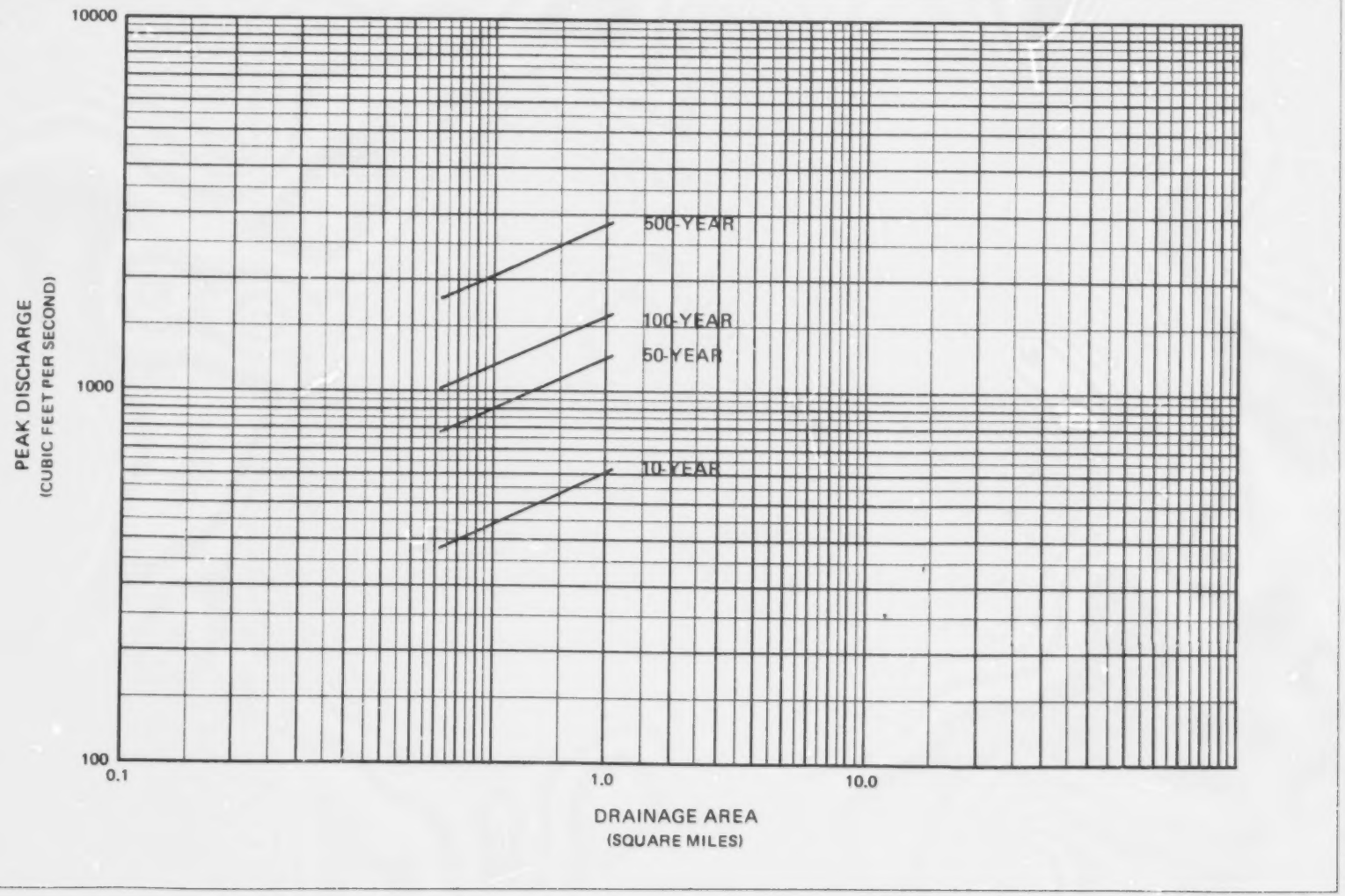

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

6

FORNES RUN

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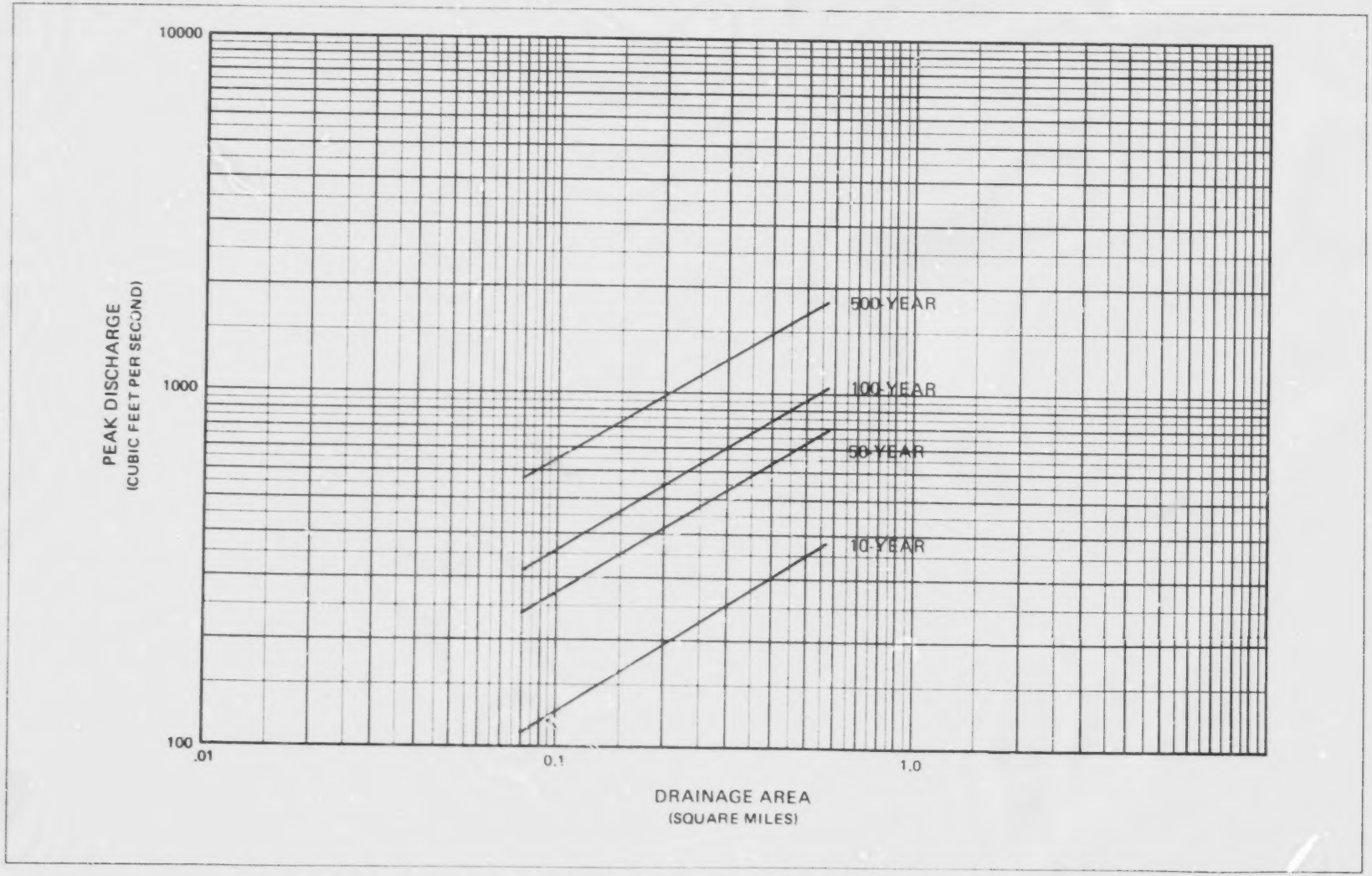

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

REEDY BRANCH

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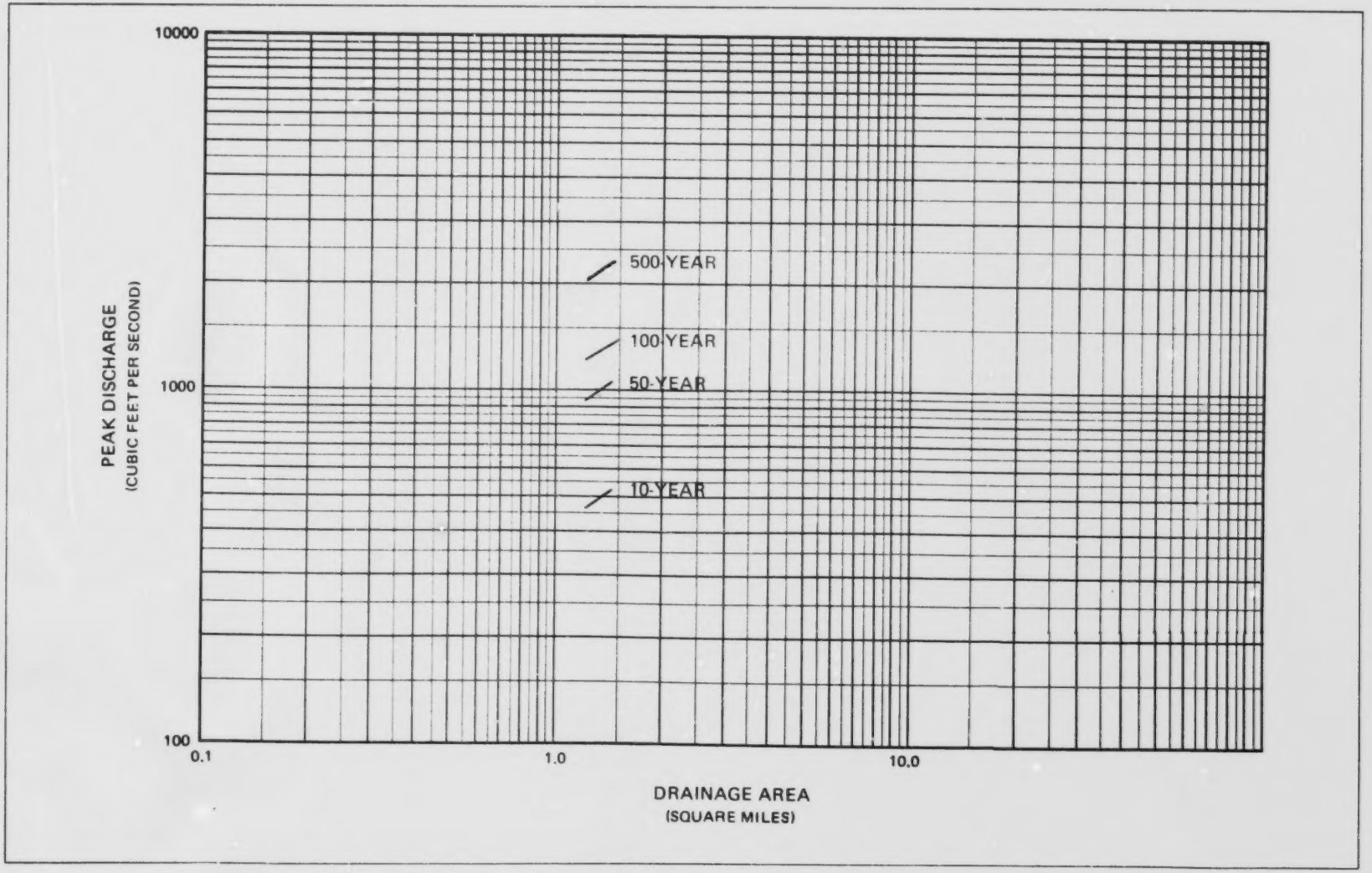

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

8 **BELLS BRANCH**

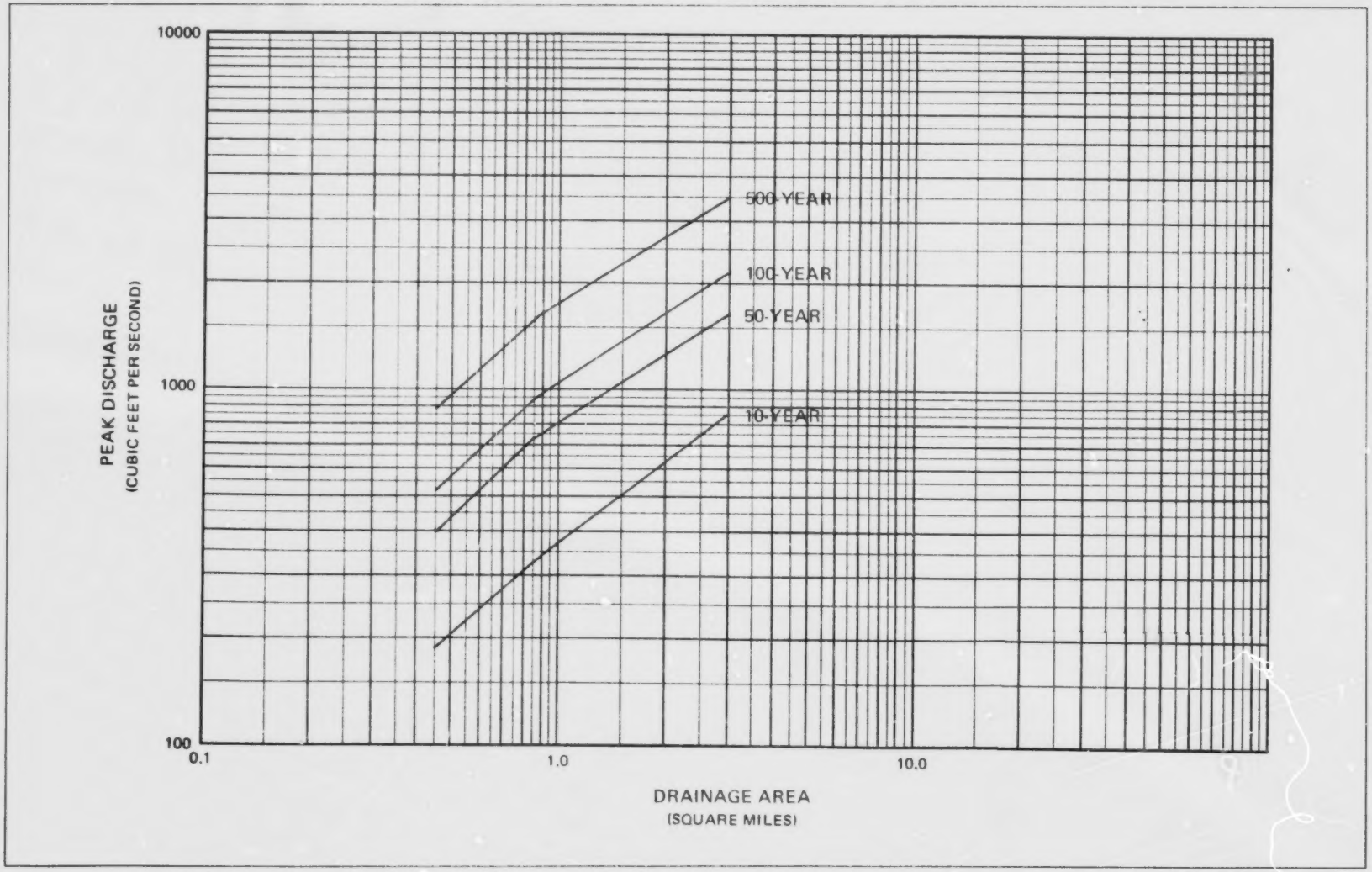

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

MEETING HOUSE BRANCH

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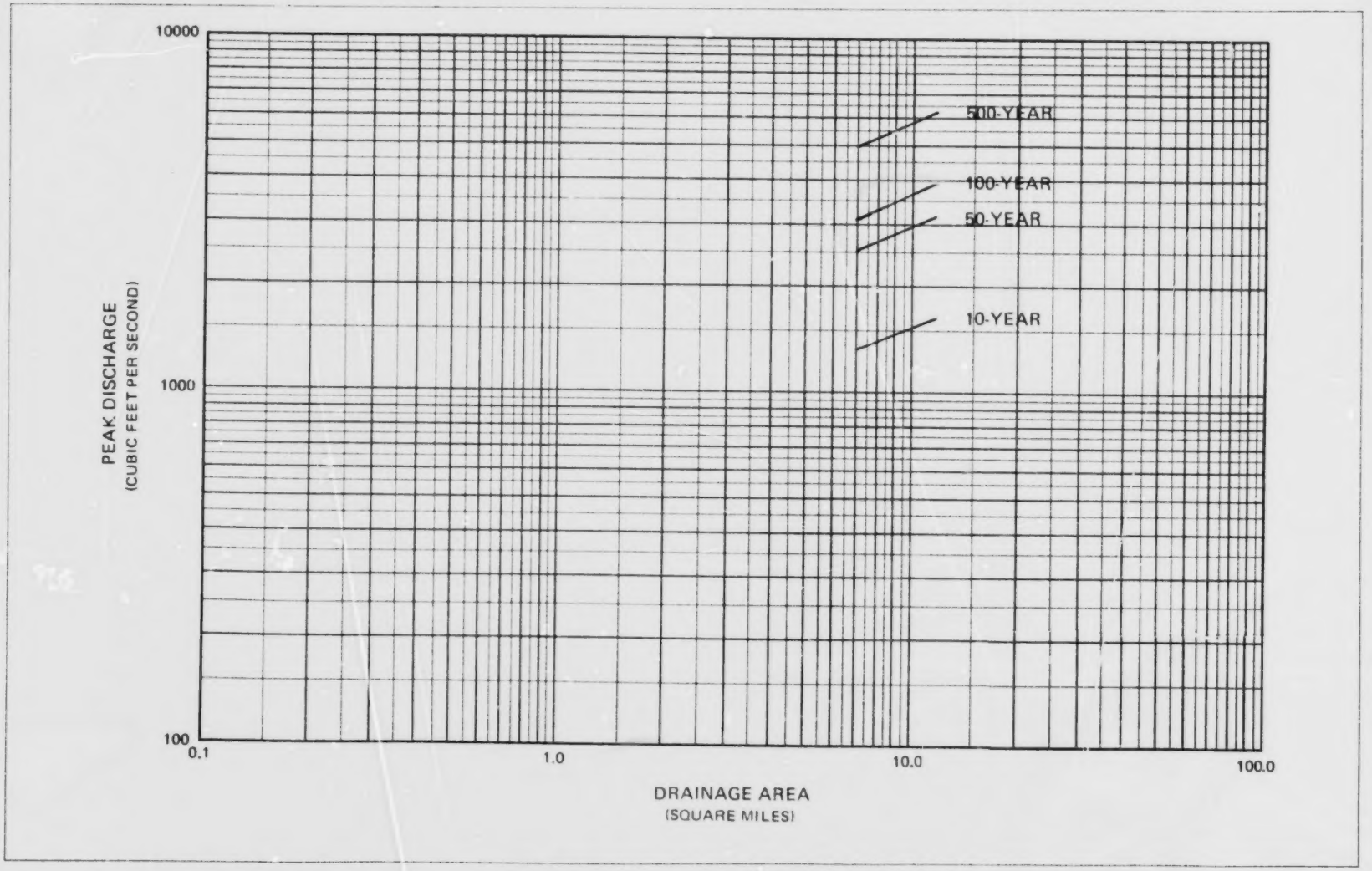

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

10 HARDEE CREEK

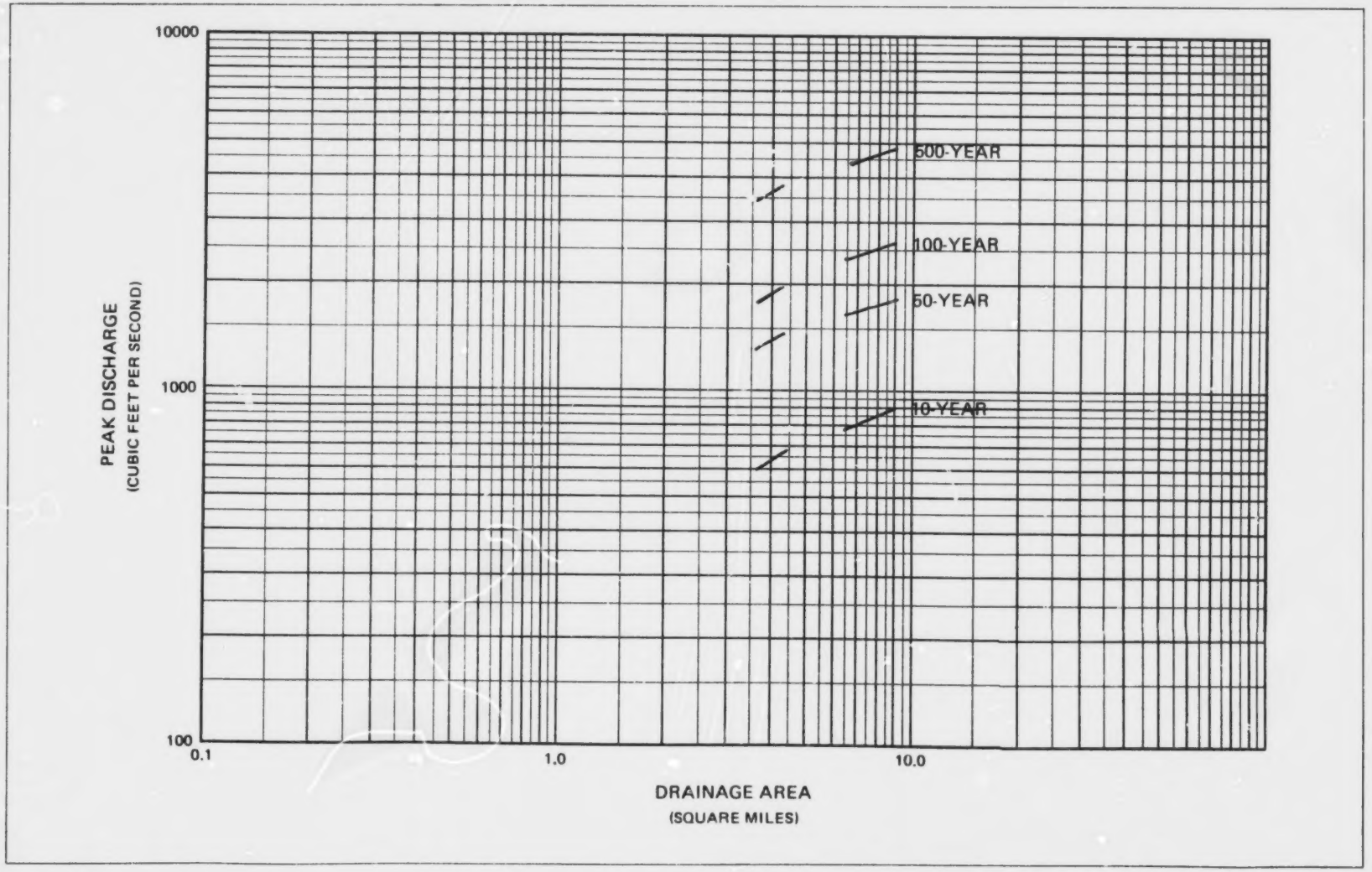

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

PARKERS CREEK

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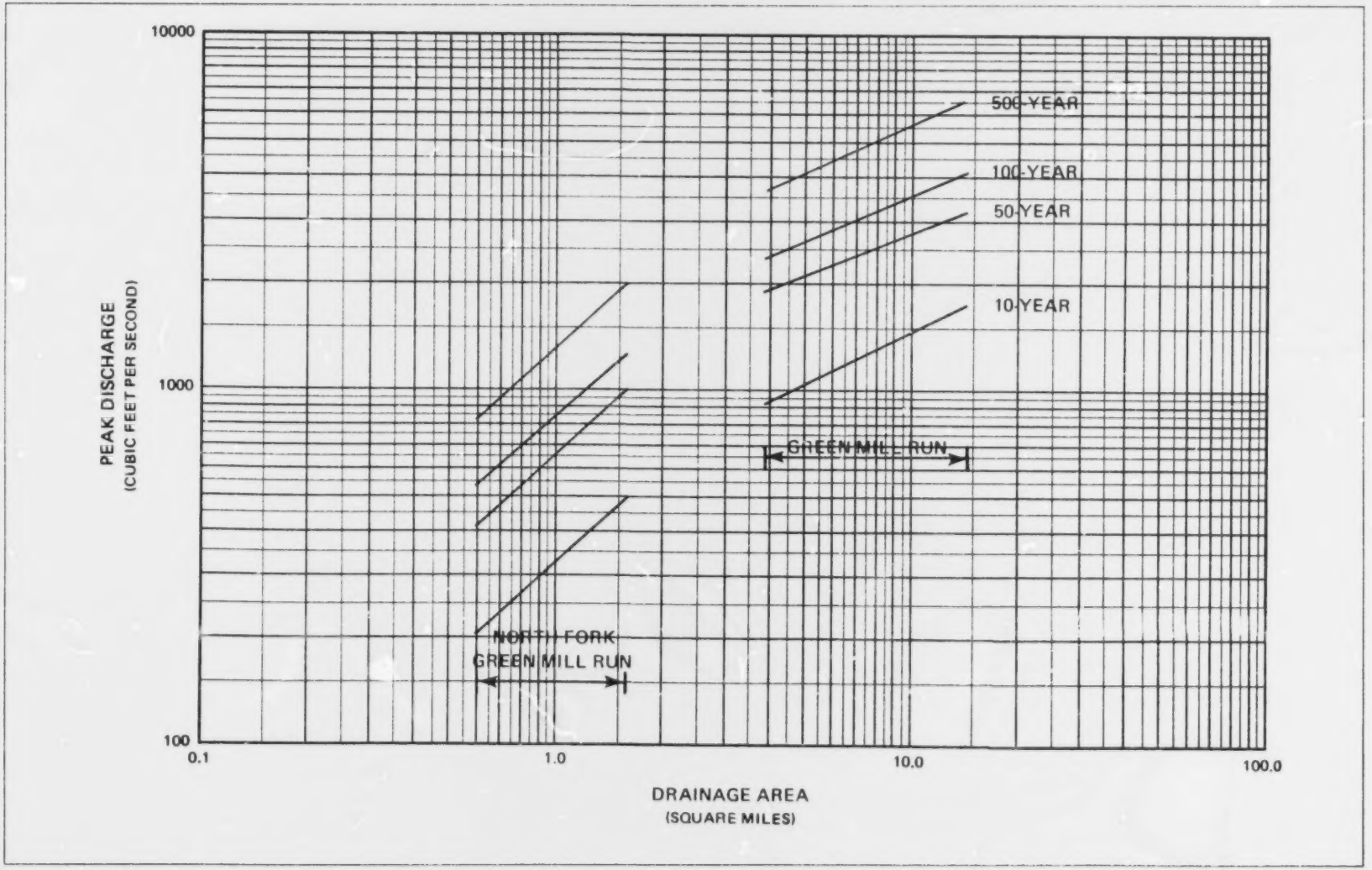

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

12 **GREEN MILL RUN-NORTH FORK GREEN MILL RUN**

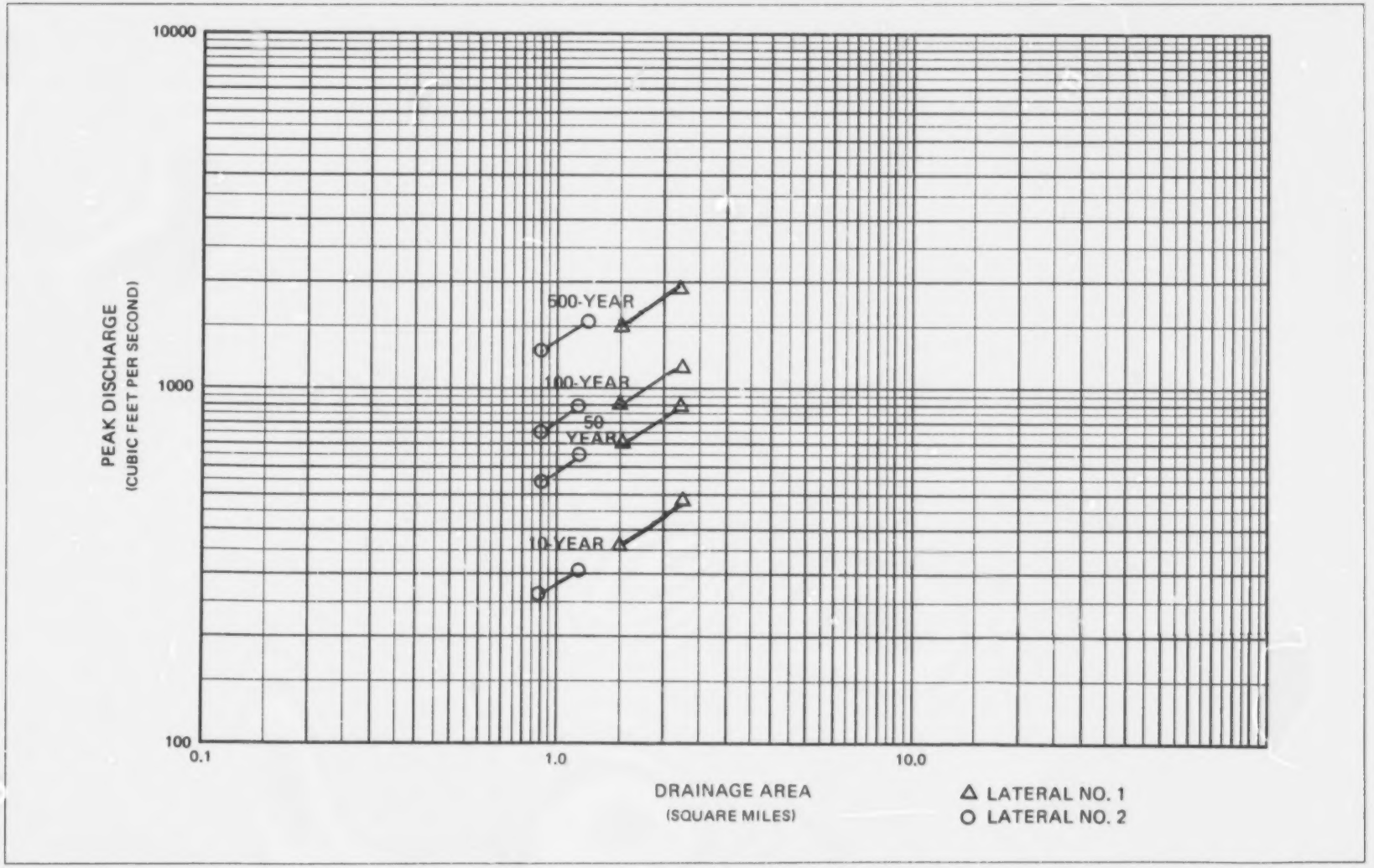

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

LATERAL NO. 1 - LATERAL NO. 2

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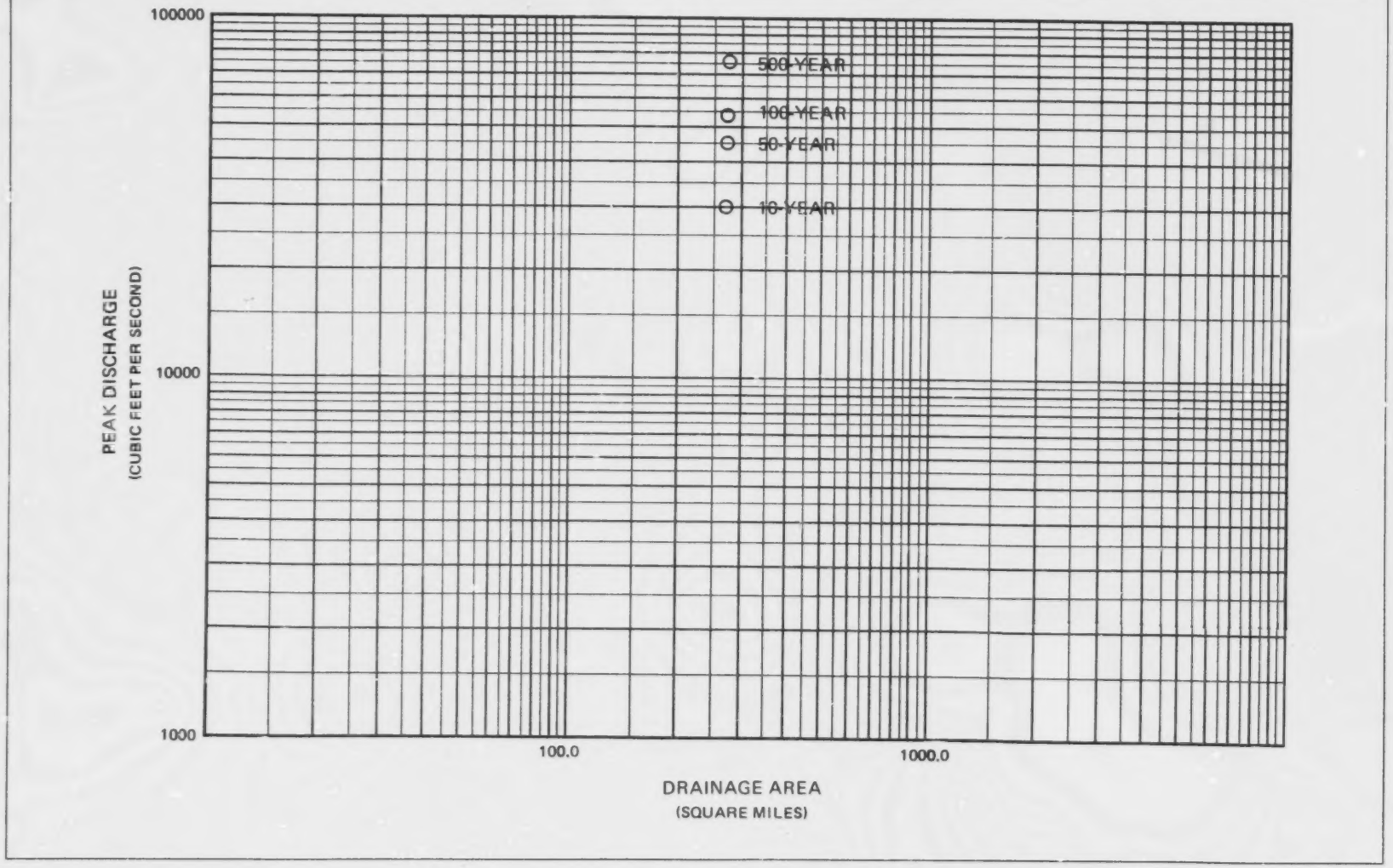

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FREQUENCY DISCHARGE, DRAINAGE AREA CURVES

14

TAR RIVER

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

A prime purpose of the National Flood Insurance Program is to encourage state and local governments to adopt sound flood plain management programs. Each Flood Insurance Study, therefore, includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and 500-year floods have been delineated using surveyed cross sectional data and stereoscopic aerial photographs (Reference 7) supplemented by topographic maps at a scale of 1:62,500, with a contour interval of 10 feet (Reference 8). For the area studied by approximate methods, the 100-year boundary was delineated using aerial photographs (Reference 7). In cases where the 100-year and 500-year flood boundaries are close together, only the 100-year boundary has been shown. Boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2).

Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to limitations of the map scale, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity and increases flood heights, thus increasing flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment in order that the 100-year flood be carried without substantial increases in flood heights. Criteria adopted by the Federal Insurance Administration limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced.

The floodway for this study was computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections on each stream studied in detail (Table 1). As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
TAR RIVER							
A	93.760	3,025[2]	43,050	1.2	21.2	20.2	1.0
B	101,174	150[3] 485[4] 120[5]	9,271	5.5	21.6	20.7	0.9
C	103,324	3,130	37,828	1.4	22.5	21.5	1.0
D	115,103	3,015	35,880	1.5	24.4	23.4	1.0
E	116,193	3,000	50,318	1.1	24.7	23.7	1.0
F	120,050	3,780	54,985	1.0	25.0	24.0	1.0

[1]Feet Above Mouth [2]Part of Floodway is Outside Extraterritorial Limits
[3]Left Channel Facing Downstream [4]Main Channel Facing Downstream [5]Right Channel Facing Downstream

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

16

TAR RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
GREEN MILL RUN								
A	2055	450	2748	1.5	21.1	11.5[2]	12.3	0.8
B	3500	160	930	4.5	21.1	15.4[2]	16.4	1.0
C	4560	380	3403	1.2	21.1	19.6[2]	19.9	0.3
D	5570	262	2492	1.6	21.1	20.4[2]	20.7	0.3
E	6575	390	2896	1.4	21.1	21.1[2]	21.4	0.3
F	7630	57	701	5.8	23.2	23.2	23.9	0.7
G	8600	290	2698	1.5	26.7	26.7	27.7	1.0
H	9300	320	1521	2.6	27.2	27.2	28.2	1.0
I	9840	370	2903	1.4	29.3	29.3	29.6	0.3
J	10,100	350	2664	1.5	29.3	29.3	29.7	0.4
K	11,260	243	1632	2.4	31.0	31.0	31.5	0.5
L	11,700	160	1456	2.7	31.8	31.8	32.5	0.7
M	12,100	190	1333	2.9	33.2	33.2	33.7	0.5
N	13,300	460	3810	1.0	34.2	34.2	35.1	0.9
O	13,750	610	4398	0.9	34.4	34.4	35.3	0.9
P	14,275	363	2164	1.8	35.2	35.2	36.0	0.8
Q	14,800	580	5043	0.8	36.2	36.2	36.8	0.6
R	16,210	580	4551	0.8	36.8	36.8	37.4	0.6
S	18,150	300	1205	3.2	38.1	38.1	38.7	0.6
T	20,595	330	2657	1.4	42.4	42.4	43.0	0.6
U	21,830	450	3087	1.1	43.8	43.8	44.6	0.8
V	22,800	400	3613	0.9	46.4	46.4	47.1	0.7
W	23,895	390	3003	1.1	47.2	47.2	48.0	0.8
X	24,600	410	3188	1.1	47.9	47.9	48.9	1.0
Y	25,300	300	2697	1.2	48.3	48.3	49.3	1.0
Z	26,310	400	2801	0.9	49.9	49.9	50.7	0.8

[1]FEET ABOVE CONFLUENCE WITH TAR RIVER
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM TAR RIVER

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TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOODWAY DATA

GREEN MILL RUN

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
GREEN MILL RUN								
AA	28,160	260	1962	1.2	51.5	51.5	52.2	0.7
AB	29,360	270	1711	1.3	53.0	53.0	53.7	0.7
AC	32,650	212	1403	1.1	58.8	58.8	59.8	1.0
AD	33,850	170	987	1.5	60.0	60.0	60.3	0.3
AE	34,600	172	879	1.7	60.4	60.4	60.9	0.5
AF	36,050	170	780	1.5	63.3	63.3	64.2	0.9
AG	37,050	170	1048	1.0	64.7	64.7	65.7	1.0

[1]FEET ABOVE CONFLUENCE WITH TAR RIVER

REVISED: 4/30/1986

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOODWAY DATA

18

GREEN MILL RUN

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
NORTH FORK GREEN MILL RUN							
A	700	175	1,235	1.0	58.4	58.4	0.0
B	3,500	120	463	2.0	60.7	59.8	0.9
C	3,775	120	458	1.9	61.4	60.6	0.8
D	4,200	115	957	0.9	69.1	69.0	0.1
E	5,350	125	779	0.9	69.5	69.0	0.5
F	6,650	100	458	1.2	70.2	69.2	1.0

[1]Feet Above Confluence with Green Mill Run

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

NORTH FORK GREEN MILL RUN

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
FORNES RUN								
A	850	90	527	2.9	25.4	23.6[2]	24.3	0.7
B	2050	70	394	3.7	28.6	28.6	28.9	0.3
C	2800	70	269	5.0	32.5	32.5	32.9	0.4
D	3115	26	138	9.7	34.8	34.8	34.8	0.0
E	3350	70	585	2.3	40.7	40.7	40.7	0.0
F	3500	64	372	3.6	40.7	40.7	40.7	0.0
G	3720	70	1145	1.2	52.8	52.8	52.8	0.0
H	4570	70	838	1.5	52.9	52.9	53.0	0.1
I	5600	68	350	3.3	53.2	53.2	53.6	0.4
J	5760	30	161	7.1	53.2	53.2	53.6	0.4
K	6100	100	768	1.3	61.5	61.5	62.5	1.0

[1]FEET ABOVE CONFLUENCE WITH GREEN MILL RUN
[2]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM GREEN MILL RUN

REVISED: 4/30/1986

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOODWAY DATA

20

FORNES RUN

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
PARKERS CREEK								
A	5985	560	1624	1.4	22.7	16.9[2]	17.8	0.9
B	7250	450	3498	0.6	22.7	17.4[2]	18.3	0.9
C	9050	425	3614	0.6	22.7	18.1[2]	19.0	0.9
D	13,216	225	1211	1.9	22.7	20.0[2]	20.9	0.9
E	18,018	250	1213	1.8	24.8	24.8	25.5	0.7

[1]FEET ABOVE CONFLUENCE WITH TAR RIVER
[2]ELEVATIONS WITHOUT CONSIDERING OVERFLOW EFFECT FROM TAR RIVER

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TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOODWAY DATA

PARKERS CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
LATERAL NO. 1								
A	1530	215	1038	1.2	23.1	19.2[2]	20.2	1.0
B	2741	210	738	1.7	23.4	21.4[2]	22.1	0.7
C	2868	180	578	2.1	23.6	22.3[2]	22.5	0.2
D	3796	100	617	2.0	24.0	22.6[2]	23.5	0.9
LATERAL NO. 2								
A	2271	90	504	1.7	25.6	25.6	26.5	0.9

[1]FEET ABOVE CONFLUENCE WITH PARKERS CREEK
[2]ELEVATIONS WITHOUT CONSIDERING OVERFLOW EFFECT FROM TAR RIVER

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TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

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LATERAL NO. 1—LATERAL NO. 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
HARDEE CREEK							
A	4,585	160	1,037	3.7	13.3[2]	12.3[2]	1.0
B	5,200	160	1,831	1.9	19.8[2]	19.3[2]	0.5
C	8,250	180	1,600	2.1	22.0	21.2	0.8
D	9,350	150	989	3.3	23.5	23.1	0.4
E	9,805	95	754	4.4	26.5	26.5	0.0
F	10,150	150	1,234	2.7	27.5	27.2	0.3
G	11,800	150	1,320	2.5	30.2	29.4	0.8

[1]Feet Above Confluence with Tar River [2]Without Effect of Backwater from Tar River

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

HARDEE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
BELLS BRANCH							
A	235	190	1,097	1.9	14.0[2]	13.0[2]	1.0
B	550	120	1,111	1.9	18.1[2]	17.9[2]	0.2
C	1,600	160	950	2.2	19.8[2]	19.2[2]	0.6
D	2,800	150	775	2.5	23.5	22.6	0.9
E	3,035	160	726	2.6	24.5	23.7	0.8
F	3,200	120	1,228	1.5	25.7	24.7	1.0
G	4,230	110	216	4.4	28.9	28.5	0.4
H	4,900	80	484	1.5	33.6	32.8	0.8
I	5,900	60	132	4.7	35.5	34.9	0.6
J	6,165	50	165	3.8	42.9	42.8	0.1
K	6,400	60	746	0.8	55.8	55.8	0.0
L	6,900	60	612	0.8	56.0	55.8	0.2

[1]Feet Above Confluence with Hardee Creek

[2]Without Effect of Backwater from Tar River

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOODWAY DATA

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BELLS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
REEDY BRANCH							
A	500	125	286	3.5	19.5[2]	18.5[2]	1.0
B	625	125	611	1.6	20.2[2]	19.2[2]	1.0
C	950	120	1,746	0.5	36.0	36.0	0.0
D	1,950	90	1,064	0.8	36.1	36.0	0.1
E	2,780	80	519	1.4	36.2	36.0	0.2
F	2,952	100	180	4.1	36.2	36.0	0.2
G	3,140	50	143	4.8	37.3	36.7	0.6
H	3,840	50	79	7.7	42.7	42.7	0.0
I	4,640	60	150	3.5	51.4	51.0	0.4
J	4,976	50	106	4.9	55.9	55.9	0.0
K	5,375	50	103	4.3	59.4	58.7	0.7
L	5,825	50	125	3.5	62.2	61.8	0.4
M	5,907	50	77	5.7	63.3	63.3	0.0
N	6,225	60	275	1.4	67.7	67.4	0.3

[1]Feet Above Confluence with Green Mill Run [2]Without Effect of Backwater from Green Mill Run

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

REEDY BRANCH

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION		
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WITH FLOODWAY	WITHOUT FLOODWAY (FEET NGVD)	DIFFERENCE
MEETING HOUSE BRANCH							
A	1,890	100	372	3.5	33.1	33.1	0.0
B	2,045	80	222	5.9	33.7	33.7	0.0
C	2,260	70	399	3.3	34.8	34.8	0.0
D	2,860	50	170	7.3	35.9	35.6	0.3
E	3,310	70	374	3.3	36.6	36.5	0.1

[1]Feet Above Confluence with Bells Branch

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOODWAY DATA

MEETING HOUSE BRANCH

determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood boundary are close together, only the floodway has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 3.

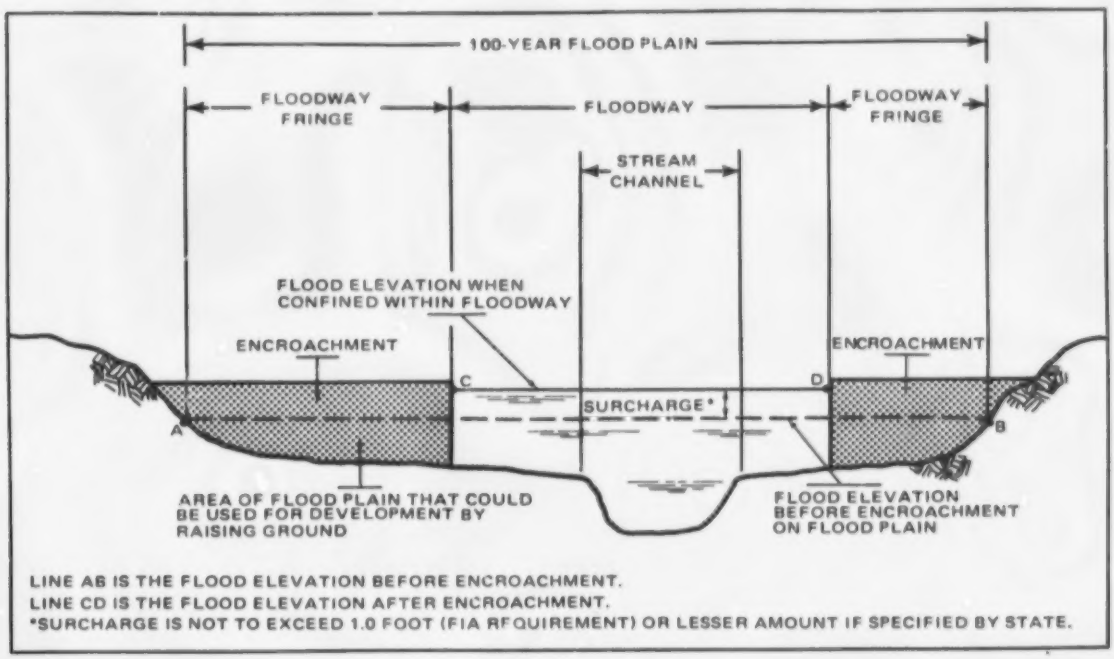
100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT.
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT.
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

Figure 3. Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the Federal Insurance Administration has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting the City of Greenville.

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5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet

Twenty-two reaches meeting the above criteria were required for the flooding sources of Greenville. These included one each on the Tar River, Lateral No. 1, Lateral No. 2, Parkers Creek, Hardee Creek, and Meeting House Branch; two each on Green Mill Run, North Fork Green Mill Run, and Bells Branch; four on Fornes Run; and, six on Reedy Branch. The locations of the reaches are shown on the Flood Profiles (Exhibit 1).

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is the Federal Insurance Administration device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHF are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest one-half foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective Flood Hazard Factors, the entire area within the extraterritorial zoning limits of Greenville was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

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Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or Flood Hazard Factors determined.
Zones A1, A2, A4, A5, A6, A7, A8, A10, A15, A17, A20, and A21:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to Flood Hazard Factors.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 2, "Flood Insurance Zone Data," summarizes the flood elevation differences, Flood Hazard Factors, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Greenville is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the Federal Insurance Administration.

6.0 OTHER STUDIES

The U.S. Army Corps of Engineers completed a Tar River Basin study (Reference 9) that includes the Tar River at Greenville, and a Flood Hazard Information Report for the City of Greenville (Reference 10). All

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE BETWEEN BASE FLOOD AND:[2] 10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)	FHF	ZONE	BASE FLOOD ELEVATION[3]
Tar River							
Reach 1	0005,0010	-4.8	-1.6	3.7	050	A10	Varies
Green Mill Run							
Reach 1	0010	-3.7	-1.1	2.3	035	A7	Varies
Reach 2	0010	-3.1	-0.7	1.7	030	A6	Varies
North Fork Green Mill Run							
Reach 1	0010	-1.9	-0.6	0.6	020	A4	Varies
Reach 2	0010	-0.6	-0.2	0.5	005	A1	Varies
Fornes Run							
Reach 1	0010	-2.2	-0.9	2.0	020	A4	Varies
Reach 2	0010	-11.1	-4.1	0.8	110	A21	Varies
Reach 3	0010	-8.4	-3.5	1.2	085	A17	Varies
Reach 4	0010	-1.9	-0.3	0.9	020	A4	61

[1] FLOOD INSURANCE RATE MAP PANEL

[2] WEIGHTED AVERAGE

[3] ROUNDED TO NEAREST FOOT

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOOD INSURANCE ZONE DATA

30

TAR RIVER-GREEN MILL RUN-
NORTH FORK GREEN MILL RUN-FORNES RUN

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
PARKERS CREEK							
REACH 1	0005	−3.1	−1.1	2.8	030	A6	VARIES
REACH 2	0005	−2.2	−0.9	2.1	020	A4	VARIES
LATERAL NO. 2							
REACH 1	0005	−2.2	−0.7	1.6	020	A4	VARIES
HARDEE CREEK							
REACH 1	0005,0010	−3.6	−0.8	3.1	035	A7	VARIES
BELLS BRANCH							
REACH 1	0010	−2.4	−0.7	2.0	025	A5	VARIES
REACH 2	0010	−7.4	−0.5	0.9	075	A15	56
REEDY BRANCH							
REACH 1	0010	−10.2	−0.2	1.0	100	A20	36
REACH 2	0010	−8.3	−0.2	1.0	085	A17	36
REACH 3	0010	−4.5	−0.2	1.0	045	A9	36

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

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TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOOD INSURANCE ZONE DATA

PARKERS CREEK–
LATERAL NO. 2–HARDEE CREEK–BELLS BRANCH–REEDY BRANCH

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE BETWEEN BASE FLOOD AND:[2] 10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)	FHF	ZONE	BASE FLOOD ELEVATION[3]
Reedy Branch (cont'd)							
Reach 4	0010	-1.8	-0.3	0.9	020	A4	Varies
Reach 5	0010	-0.9	-0.5	0.7	010	A2	Varies
Reach 6	0010	-2.4	-0.3	1.0	025	A5	Varies
Meeting House Branch							
Reach 1	0010	-3.3	-1.1	2.3	035	A7	Varies

[1] FLOOD INSURANCE RATE MAP PANEL

[2] WEIGHTED AVERAGE

[3] ROUNDED TO NEAREST FOOT

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

FLOOD INSURANCE ZONE DATA

32 REEDY BRANCH-MEETING HOUSE BRANCH

technical data presented in this Flood Insurance Study are fully compatible with the other studies. This study is authoritative for purposes of the Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study are on file for 5 years at the U.S. Army Corps of Engineers, Flood Plain Management Services Branch, P.O. Box 1890, Wilmington, North Carolina 28401.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U.S. Department of Commerce, Bureau of Census, Census of Population, Washington, D.C., 1970

2. ----------, National Oceanic and Atmospheric Administration, Climatological Data-North Carolina, Annual Summary, 1973

3. Water Resources Council, "A Uniform Technique for Determining Flood Flow Frequencies, March 1976

4. U.S. Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, 1963

5. ----------, Technical Paper No. 49, Two-to-Ten Day Precipitation for Return Periods of Two-to-One Hundred Years in the Contiguous United States, 1964

6. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Generalized Computer Program, Davis, California, October 1973

7. U.S. Department of Agriculture, Aerial Photographs of Pitt County, March 16, 1970

8. U.S. Geological Survey, 15-Minute Series Topographic Maps, Scale 1:62,500, Contour Interval 10 feet: Winterville, North Carolina 1903

9. U.S. Army Corps of Engineers, Wilmington District, Tar River Basin, North Carolina, 1968

10. ----------, Flood Hazard Information Report, Greenville, North Carolina, 1975

Greenville Engineering Department, Zone Map of the Extraterritorial Jurisdiction of the City of Greenville, North Carolina, April 26, 1972

U.S. Geological Survey, 15-Minute Series Flood-Prone Area Map, Scale 1:62,500, Contour Interval 10 feet: Winterville, North Carolina (1973)

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9.0 REVISIONS DESCRIPTION (Revised: April 30, 1986)

9.1 Purpose

The purpose of this Flood Insurance Study Revisions Description is to incorporate new and revised data into this currently effective Flood Insurance Study for the City of Greenville, Pitt County, North Carolina. This Revisions Description is intended to provide updated information that aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

9.2 Acknowledgments

The hydrologic and hydraulic analyses for this Revisions Description were performed by the U.S. Army Corps of Engineers (COE), Wilmington District. The Federal Emergency Management Agency (FEMA) reviewed and accepted these data for purposes of this revision.

9.3 Scope

The hydraulic analysis for Green Mill Run was revised to incorporate new topographic data, to remove ineffective flow areas from the floodway, and to realign the floodway from just upstream of Tenth Street to just downstream of Elm Street and from about 2,000 feet downstream of South Evans Street to just upstream of Hooker Road. In addition, the hydraulic analysis for Green Mill Run was revised to include the construction of the Arlington Boulevard bridge over Green Mill Run. New topographic data were used to realign the Fornes Run floodway from the confluence with Green Mill Run to about 850 feet upstream of the confluence. The floodway for Parkers Creek was revised from about 3,000 feet upstream of Mumford Street to about 1,000 feet upstream of State Road 33. In addition, the floodway for Lateral No. 1 was realigned from the confluence with Parkers Creek to just downstream of U.S. Route 13. New topographic mapping (Reference 1) was used to redelineate flooding along each flooding source within the City of Greenville.

9.4 Hydrologic and Hydraulic Analyses

The hydraulic analysis of Green Mill Run was revised to incorporate new topographic data supplied by the City of Greenville. The addition of the Arlington Boulevard bridge over Green Mill Run was also included in the hydraulic reanalysis. Bridge plan, profile, and cross-section data were supplied by the City of Greenville. Cross-section data used for the reanalysis were generated by a recent field survey. The hydraulic analysis was performed using the COE HEC-2 computer program (Reference 2). The starting water-surface elevations used in the original hydraulic analysis were considered valid and were not revised. Roughness coefficients (Manning's "n") were assigned on the basis of field inspection of the channel and floodplain characteristics.

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The coefficients ranged from 0.011 to 0.055 for the channel and from 0.013 to 0.020 for the overbank areas.

The hydraulic analysis for Fornes Run was revised to reflect new topographic data supplied by the City of Greenville. Roughness coefficients were revised based on field inspection of the area. Channel coefficients ranged from 0.030 to 0.050; coefficients ranged from 0.053 to 0.10 for the overland areas. Cross-section data were revised based on a recent field survey. The starting water-surface elevations used in the original hydraulic analysis were considered valid and were not revised.

Parkers Creek and Lateral No. 1 were revised to incorporate new topographic data. Cross-section information was obtained through a field survey of the area. New topographic mapping was used to redelineate flooding along the other flooding sources located within the City of Greenville.

The base flood elevations, flood insurance zone designations, and regulatory floodway for these waterways have been revised as described in this Revision Description to the original Flood Insurance Study and are shown on the revised Flood Insurance Rate Map, Flood Boundary and Floodway Map, Floodway Data tables, Flood Insurance Zone Data table, and Flood Profiles.

9.5 Floodways

Floodway reanalyses for Green Mill Run, Fornes Run, Parkers Creek, and Lateral No. 1 were performed as a result of new topographic data. The floodways were computed on the basis of equal conveyance reduction from each side of the floodplain. The results of these computations were tabulated at selected cross sections for each stream segment for which a floodway was revised and are presented in Table 2, Floodway Data. The floodways for the remaining streams within the City of Greenville were realigned using the new topographic data to interpret the hydraulic analysis from the original Type 15 Flood Insurance Study.

9.6 Location of Data

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

9.7 References and Bibliography

1. Piedmont Aerial Surveys, Inc., Topographic Map, City of Greenville, Pitt County, North Carolina, Scale 1:1200, Contour Interval 2 feet, March 1973 and December 1975, revised October 1980 and March 1982.

2. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles, Generalized Computer Program, Davis, California, October 1973.

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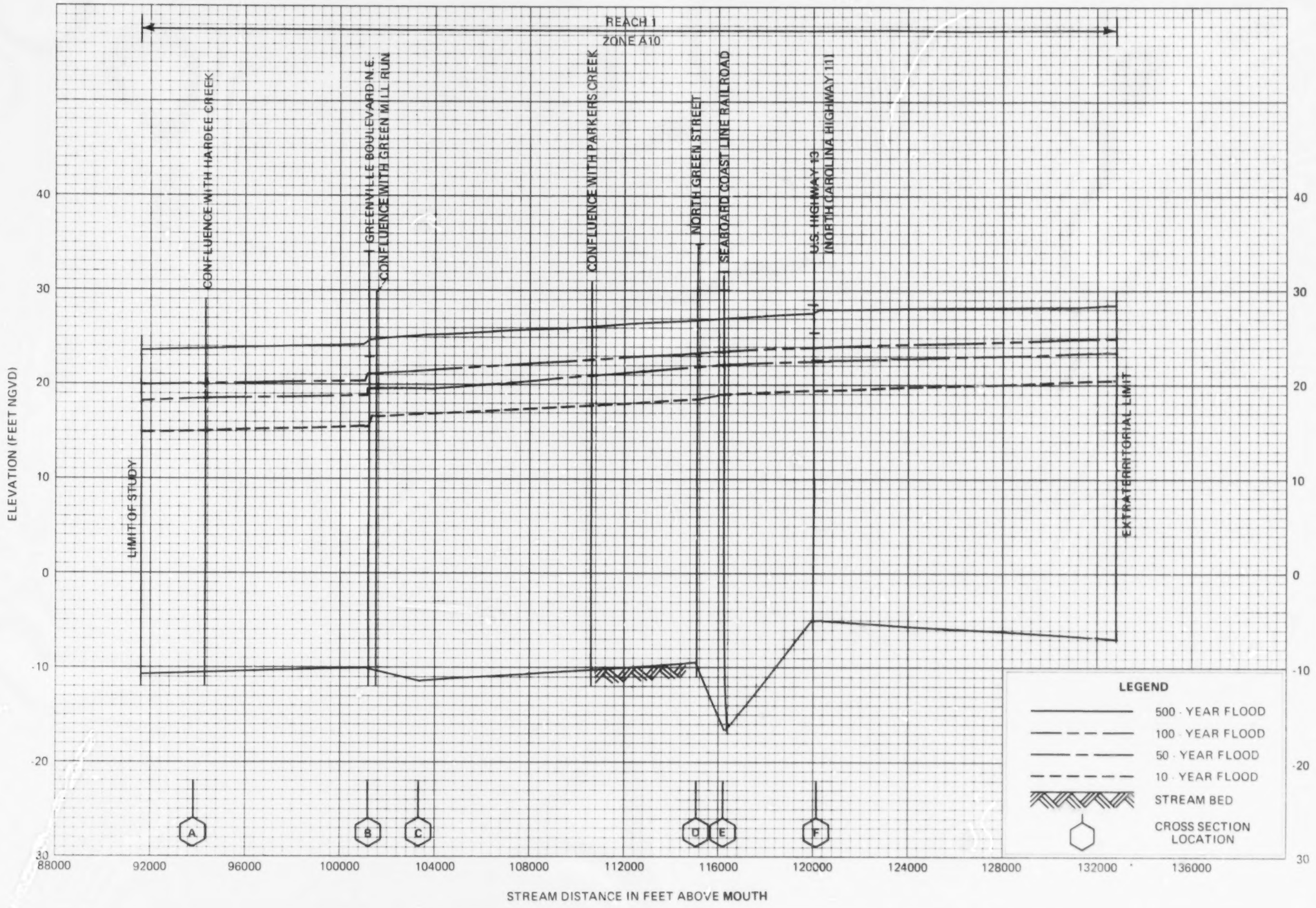

FLOOD PROFILES

TAR RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

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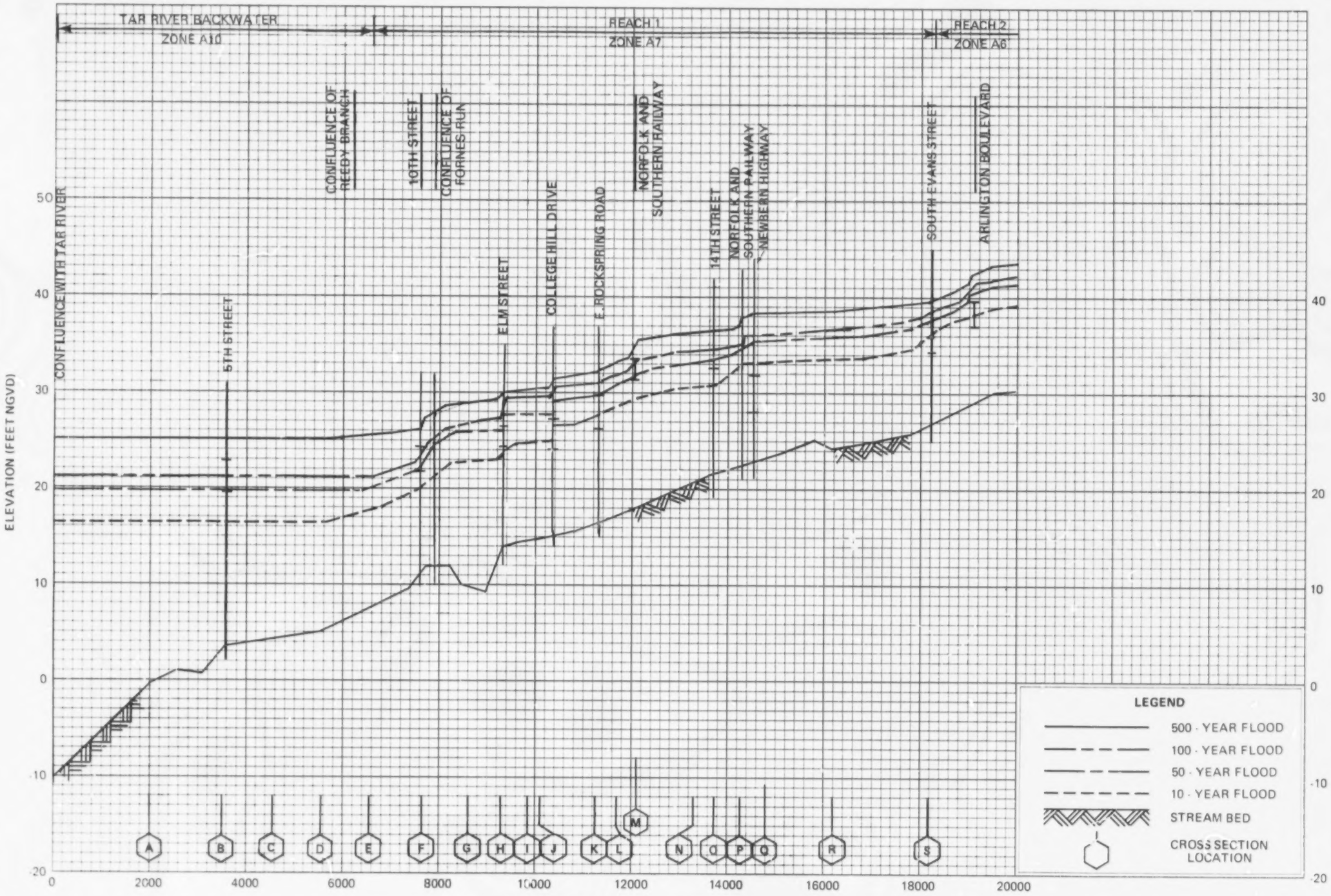

FLOOD PROFILES

GREEN MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

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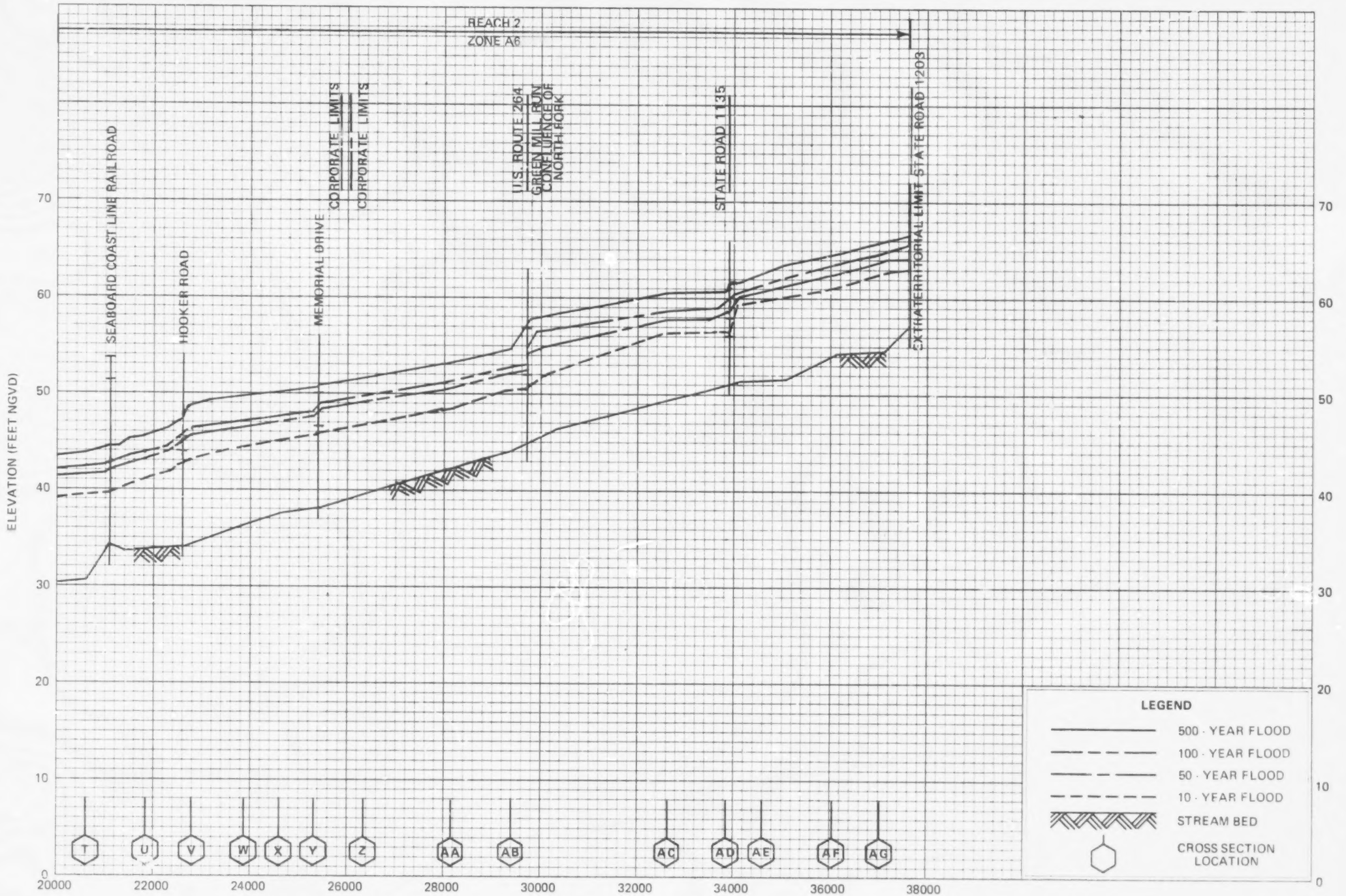


FLOOD PROFILES

GREEN MILL RUN

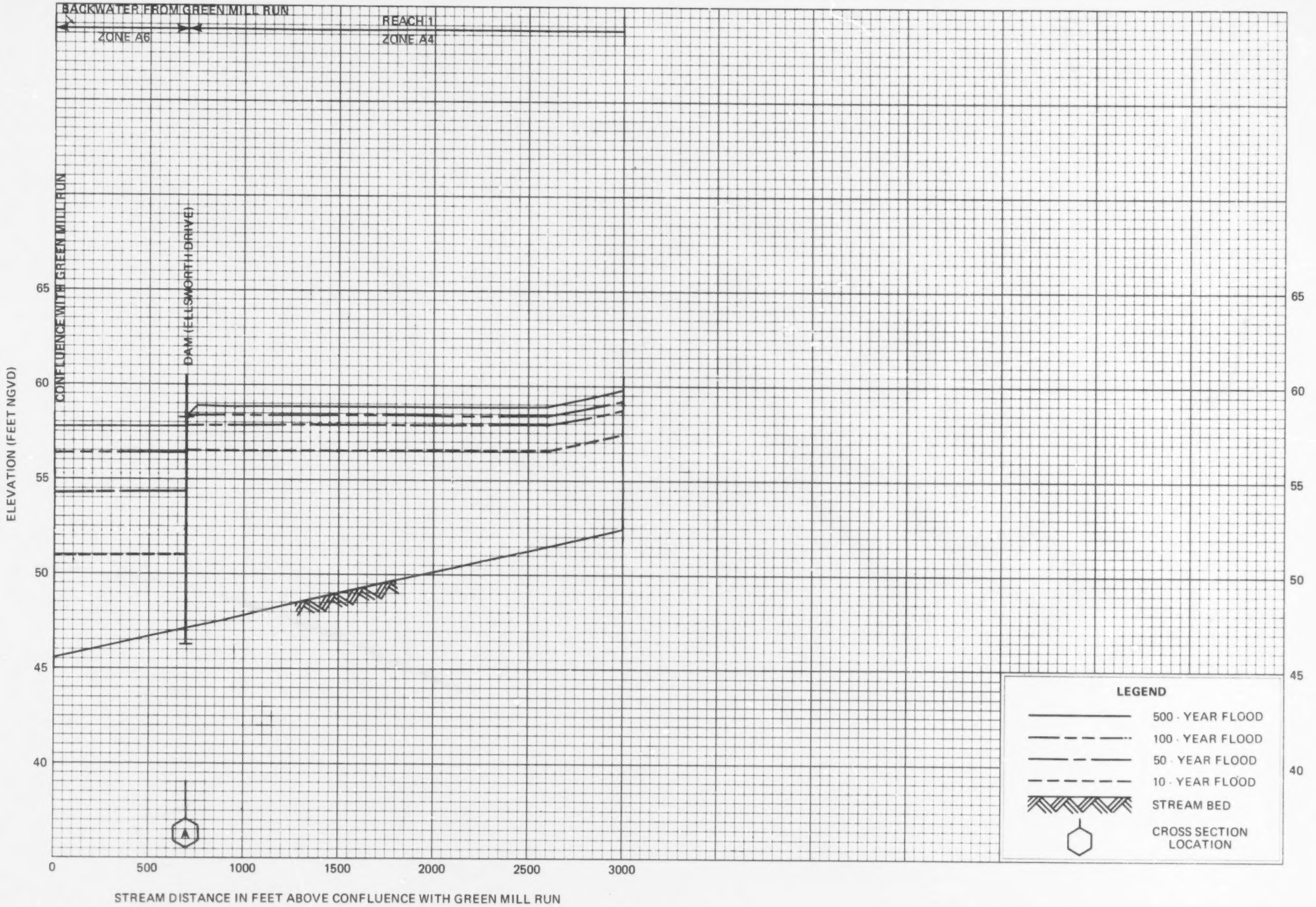
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

03P

REVISED: 4/30/1986



FLOOD PROFILES

NORTH FORK GREEN MILL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

04P

REVISED: 4/30/1986

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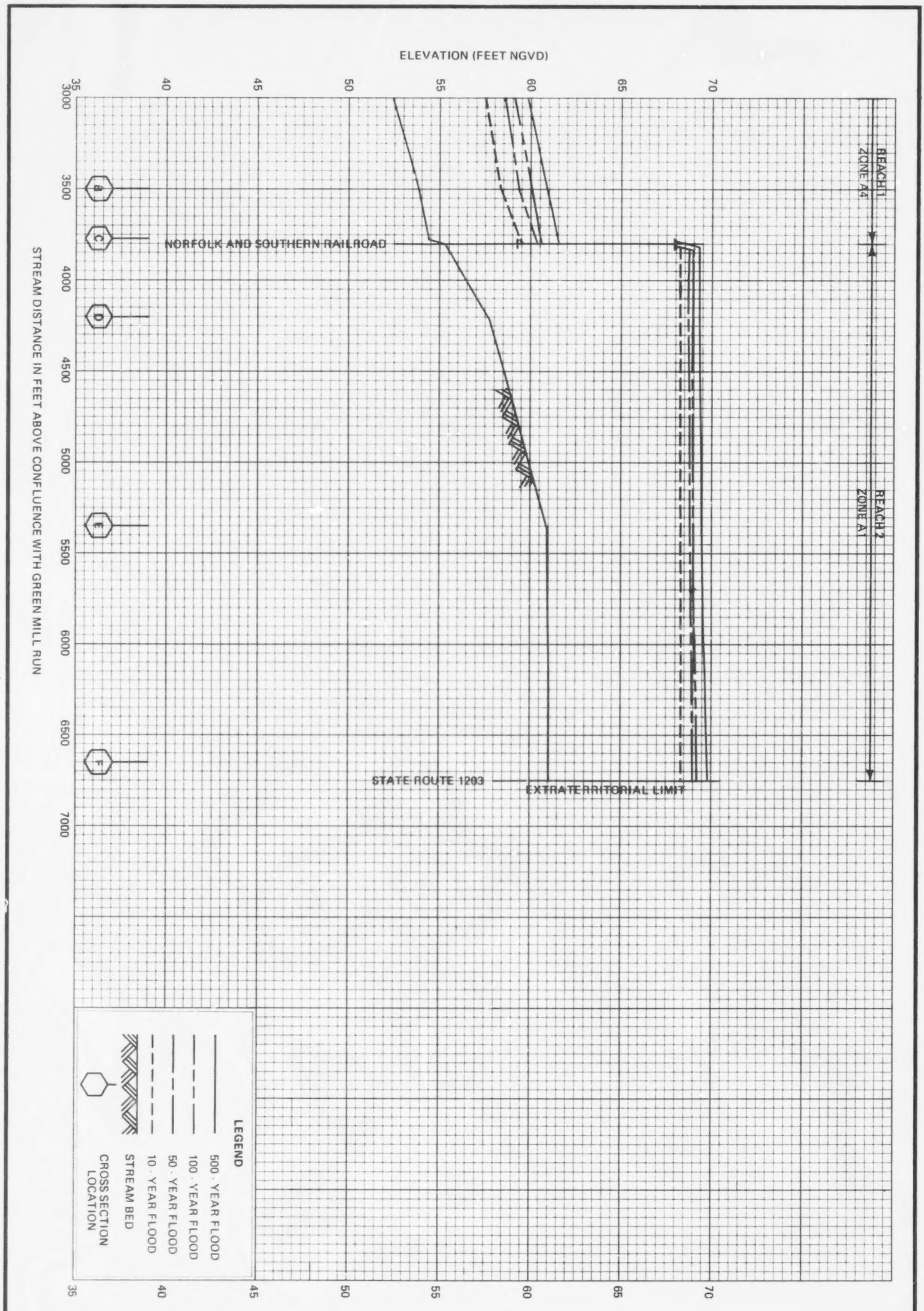


40

05P

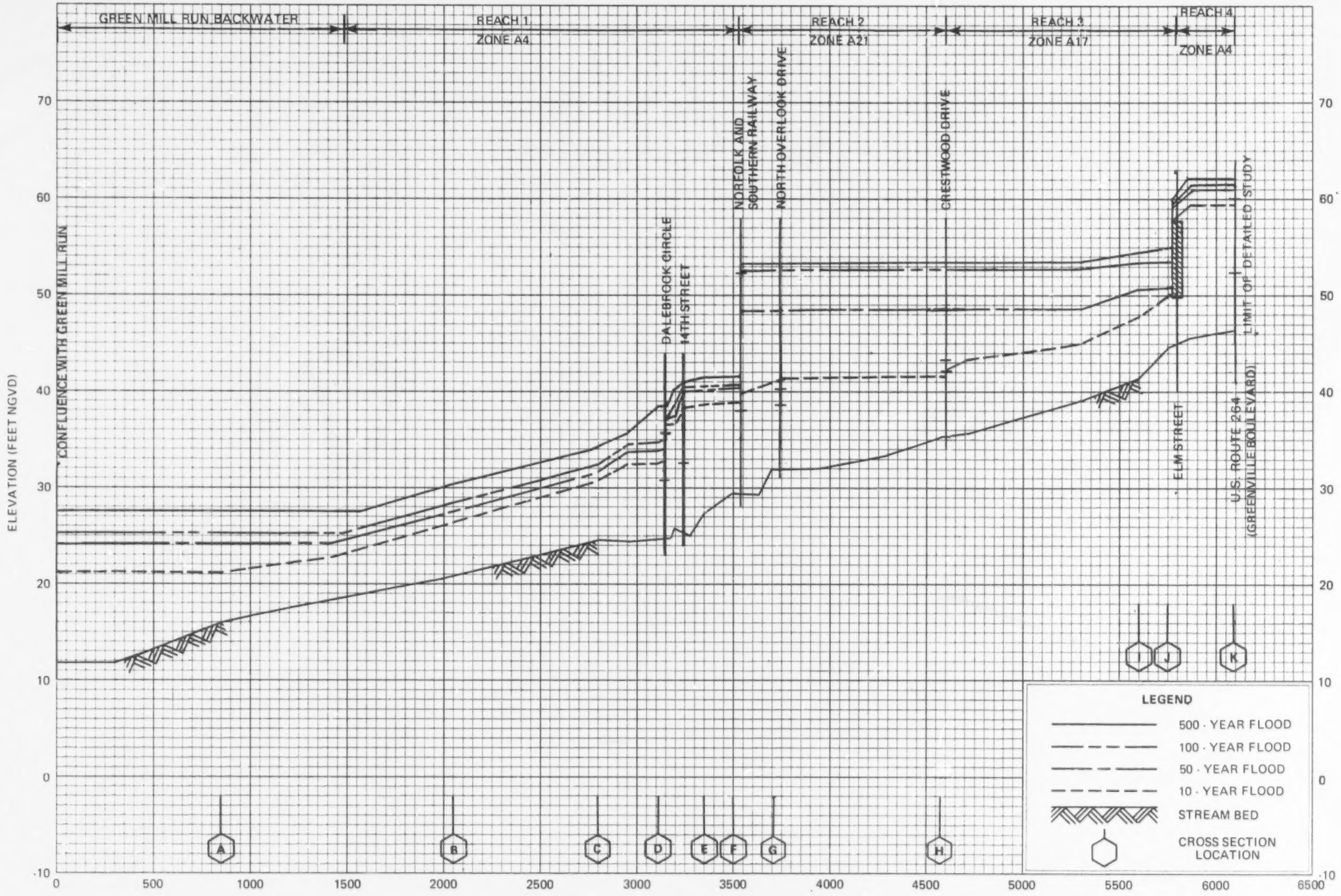
FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

FLOOD PROFILES

NORTH FORK GREEN MILL RUN



FLOOD PROFILES

FORNES RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

06P

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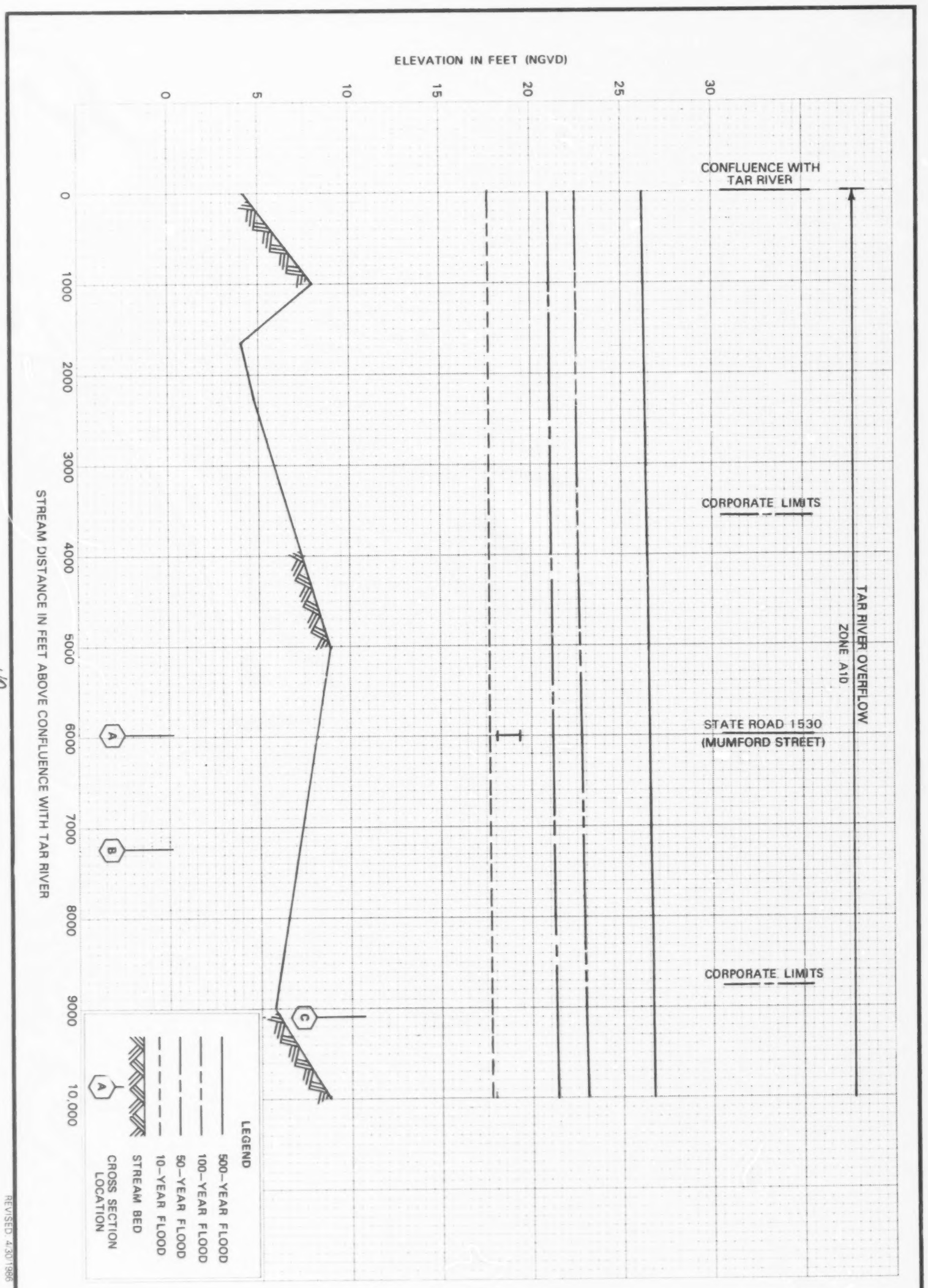

42

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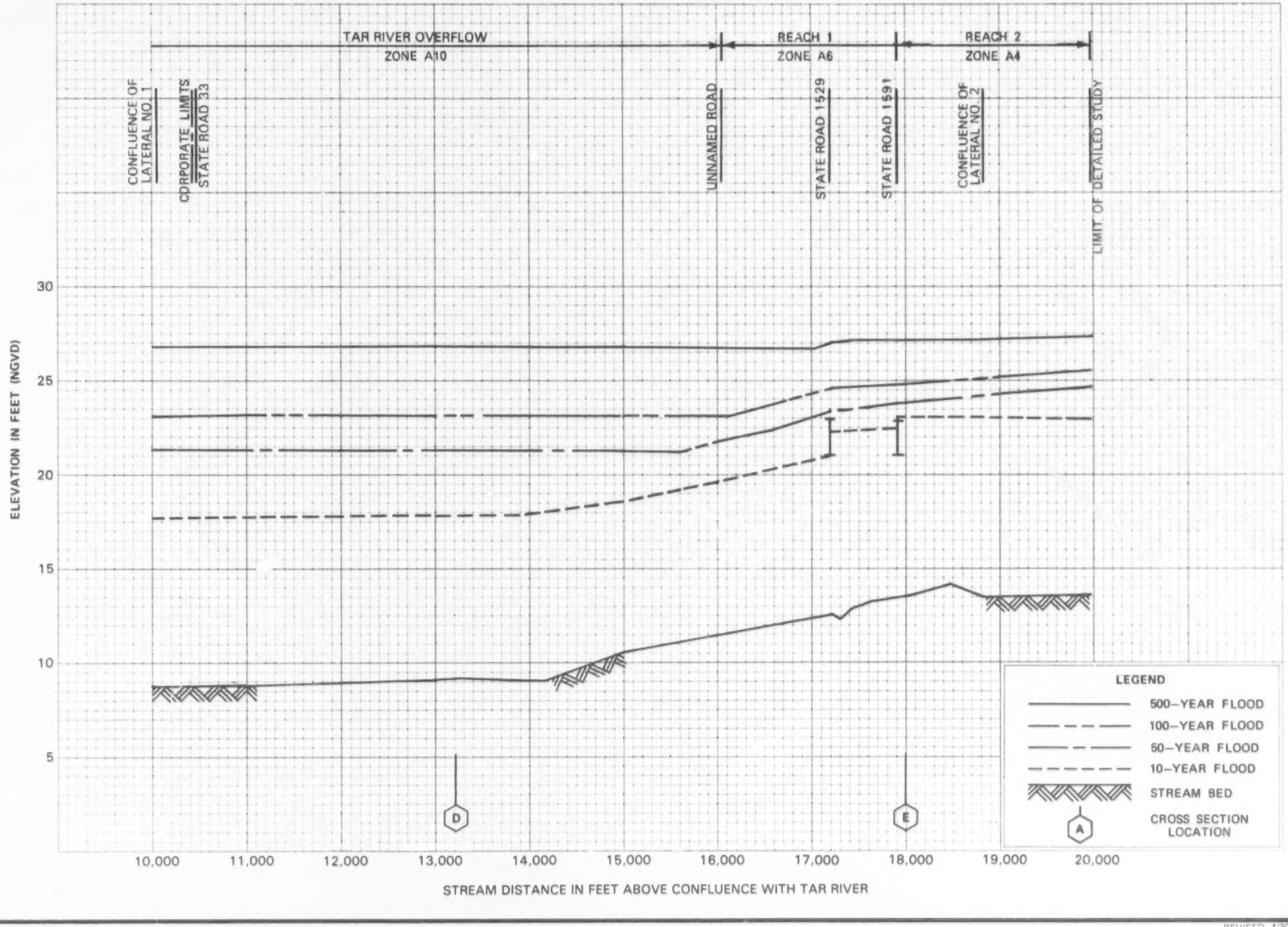
07P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF GREENVILLE, NC (PITT CO.)	FLOOD PROFILES PARKERS CREEK



FLOOD PROFILES

PARKERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

08P

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FLOOD PROFILES

LATERAL NO. 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

09P

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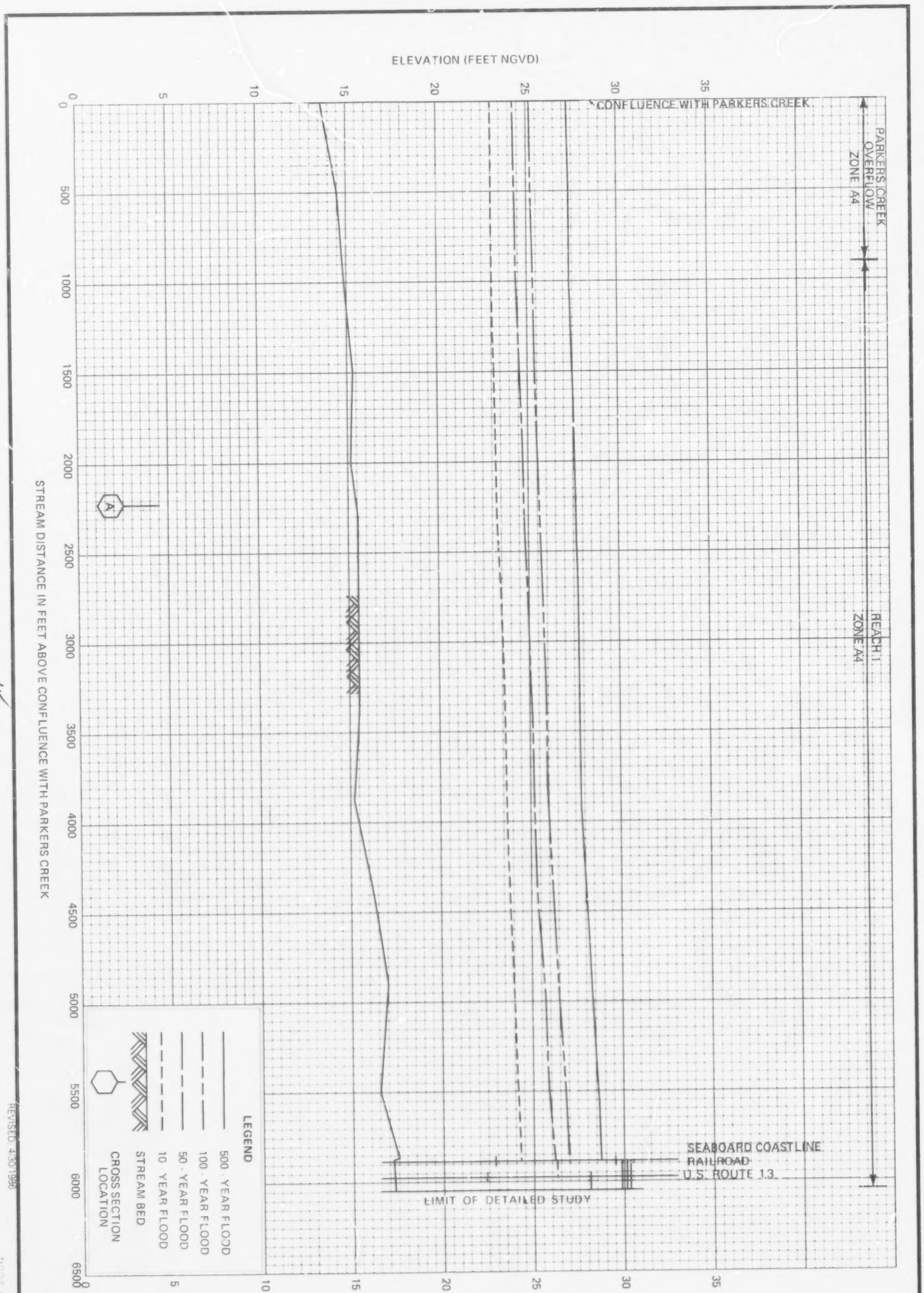
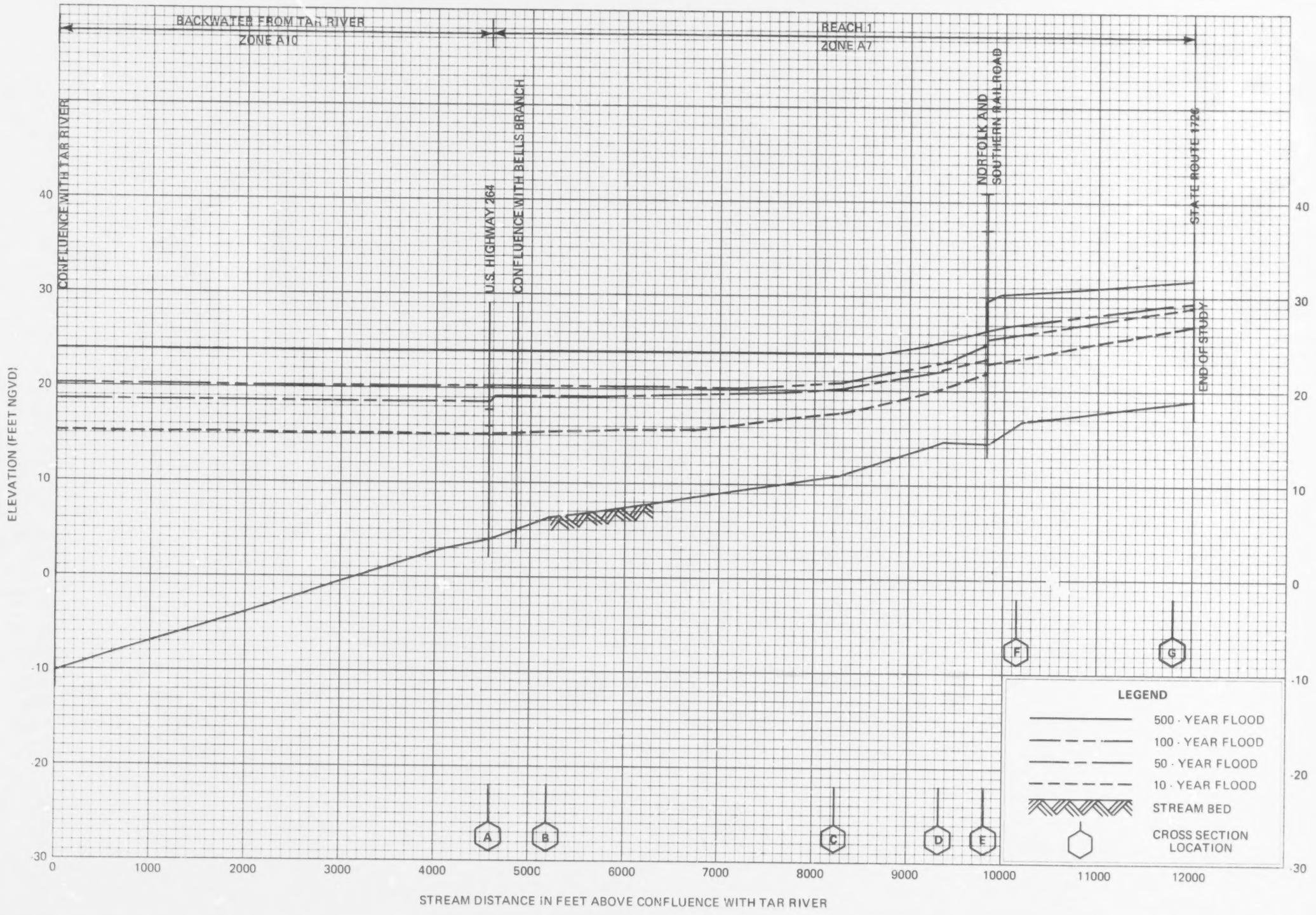


45

REVISED: 4-30-1986

10P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF GREENVILLE, NC (PITT CO.)	FLOOD PROFILES LATERAL NO. 2



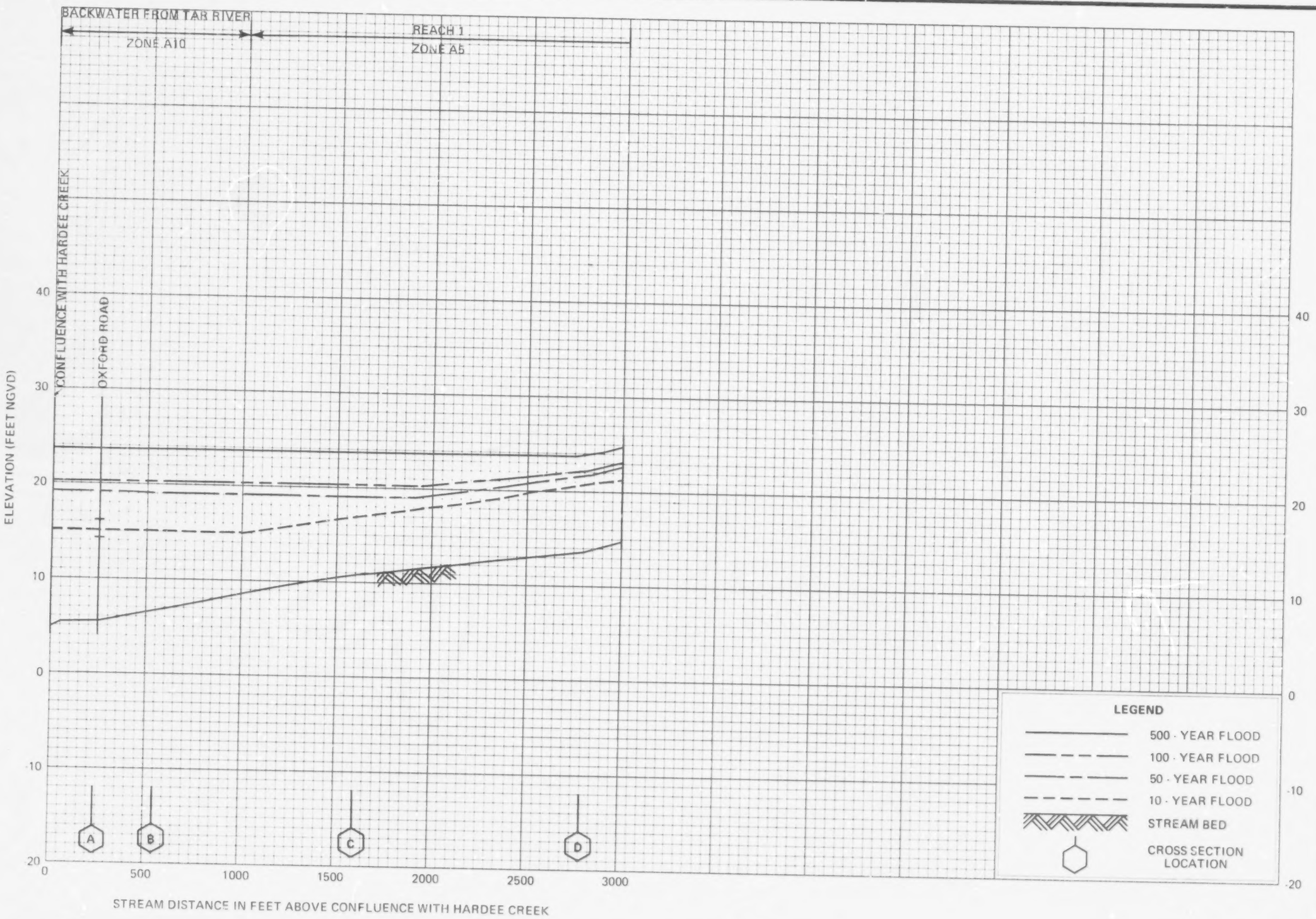
FLOOD PROFILES

HARDEE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

11P



FLOOD PROFILES

BELLS BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC
(PITT CO.)

12P

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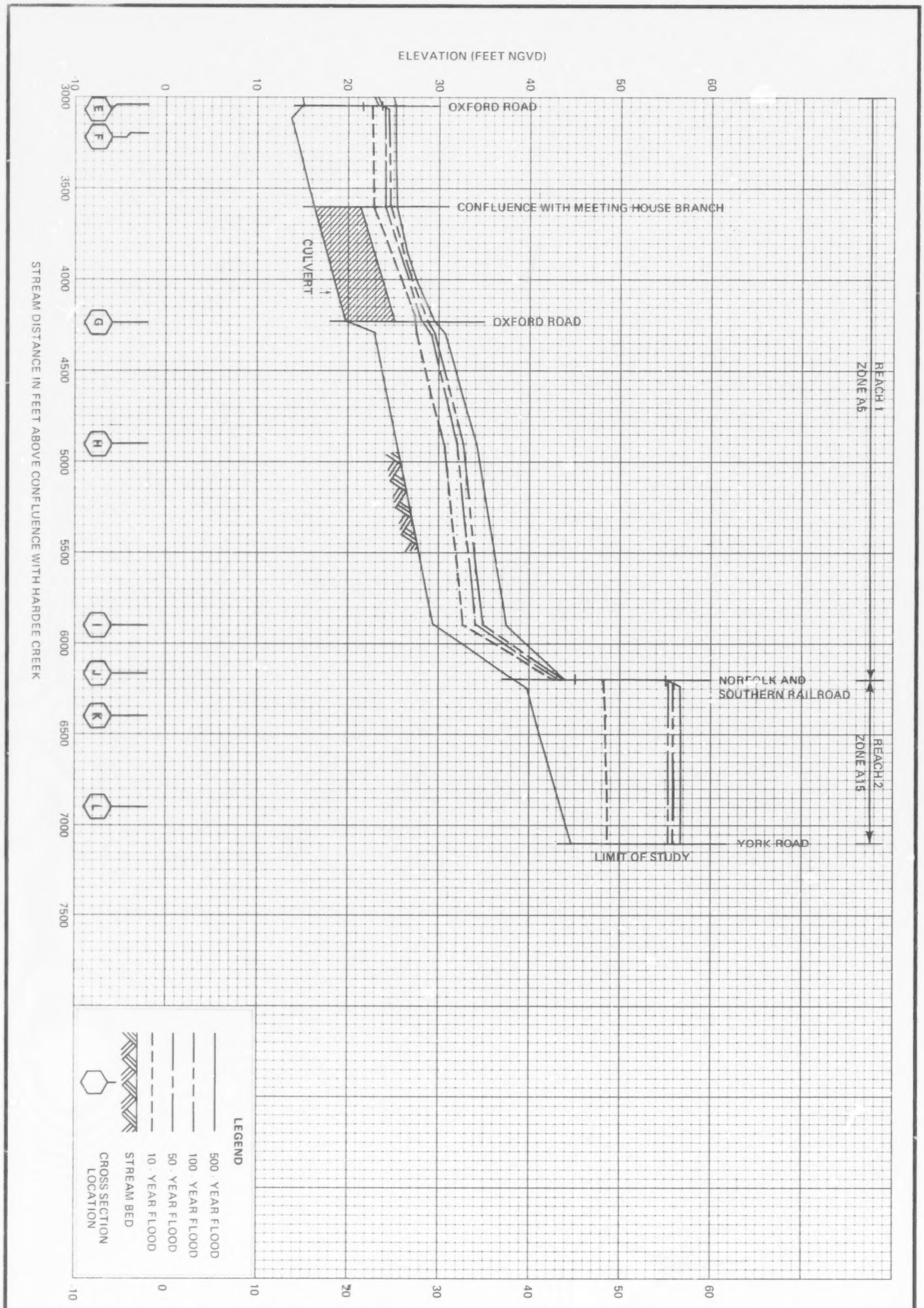

13P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF GREENVILLE, NC (PITT CO.)	FLOOD PROFILES BELLS BRANCH

48

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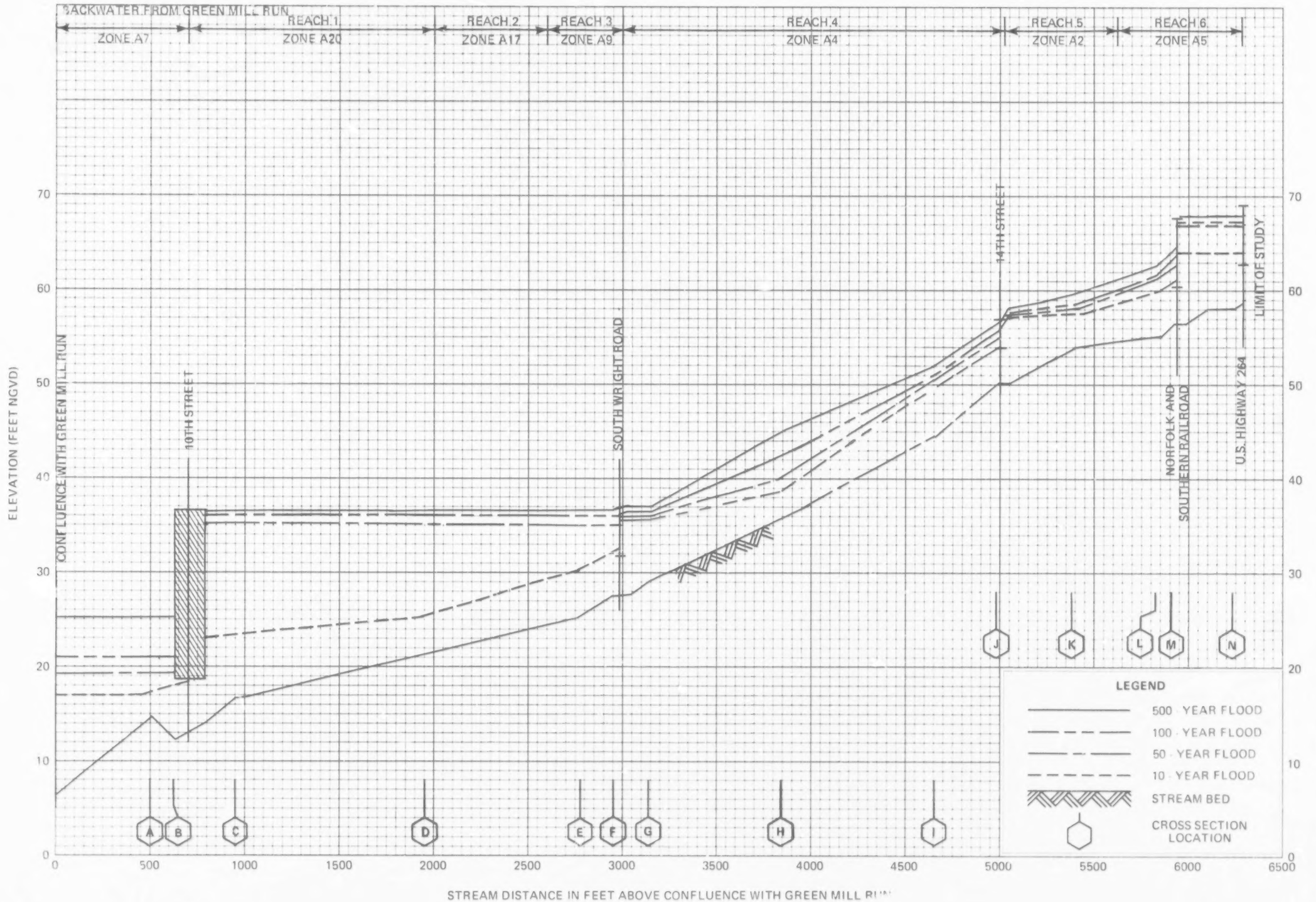

FLOOD PROFILES

REEDY BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

CITY OF GREENVILLE, NC

(PITT CO.)

14P

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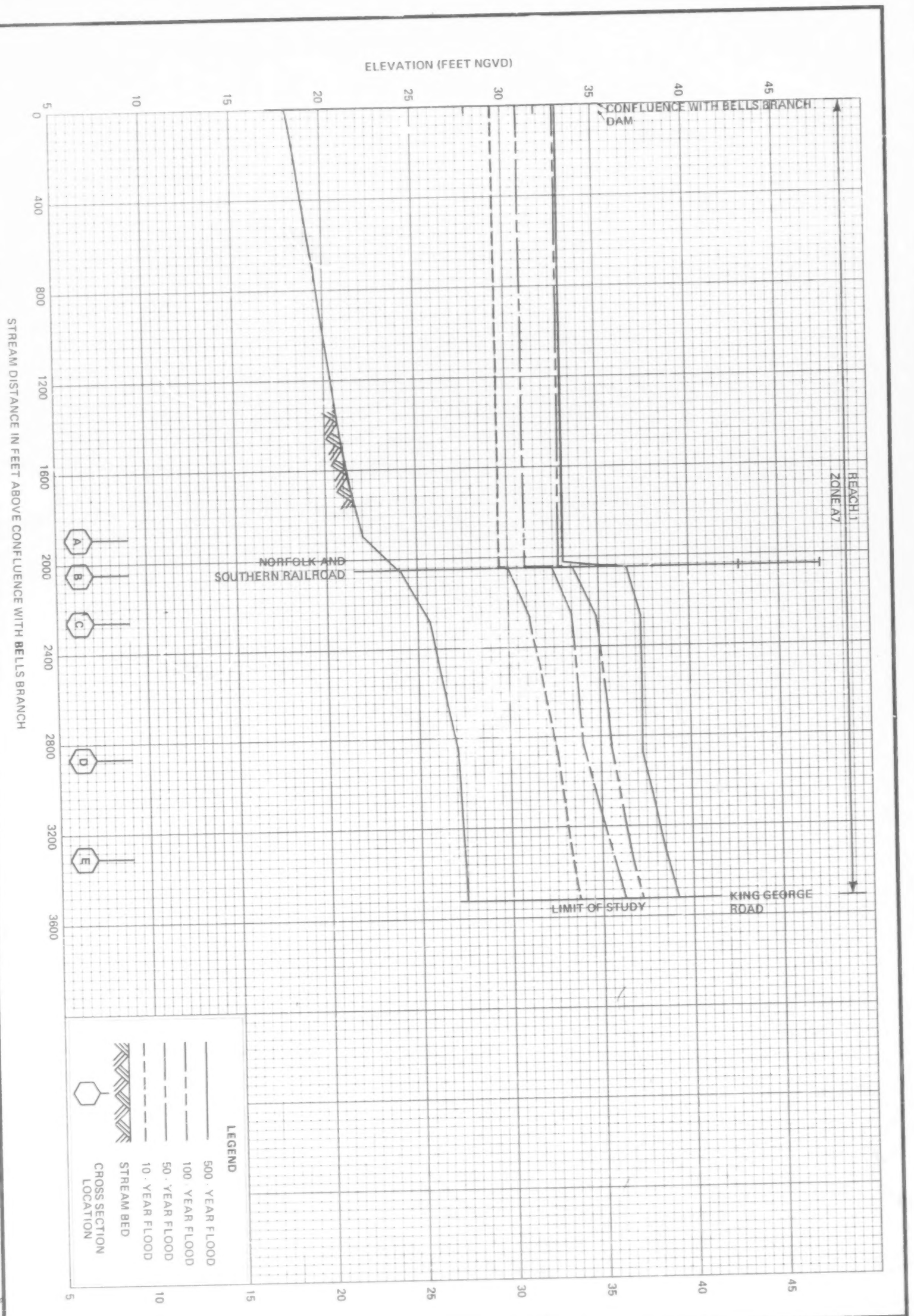

15P	FEDERAL EMERGENCY MANAGEMENT AGENCY CITY OF GREENVILLE, NC (PITT CO.)	FLOOD PROFILES MEETING HOUSE BRANCH

50

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